Amateur Radio

VOL 55, No 6,
JUNE 1987

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

- *51st Federal Convention Report*
- *Approach to Antenna Tuning*
- *UK Proposed Deregulation*
- *Equipment Reviews*
- *JFET Amplifiers*
- *Building Blocks — Part 2*

AMATEUR BARGAINS • AMATEUR BARG

FREE! With every Hand-Held sold this month we're giving away a FREE Welz Power Meter valued at $29! Cat D-1343

Huge Amateur $avings all this month!!

The $100 Yaesu bonus offer!

You won't believe your luck! The incredible Yaesu FT-209RH 2 metre hand-held is now better value than ever. With every FT-209RH sold we're giving away a FREE battery valued at $98.90!! Yes, you can now have all the features and quality of Yaesu at the lowest price ever! With up to 5 watt output (3.7W with FNB3 battery) 10 memories (it even remembers the repeater split), keyboard entry for everything, huge range of scanning options and much, much more!
Cat D-3503

$599

FREE!!! FNB-3 NiCad Battery valued at $98.90
Cat D-3506

Play it safe — bright spark!

We realize that you amateurs are a bright lot and we'd hate to see your base stations zapped out. So here's a great value station protector! The Welz Coax Lightning Protector. Fits easily to your antenna system and it'll absorb that surge if your antenna gets zapped!
Cat D-5210

ONLY $49.85

Hand-held Scan Mic

This'll make life easy! Suits all Yaesu transceivers with scanning function. Has 8 pin plug for easy hook up and the compact design makes it easy to hold for long periods. 500 ohms impedance. Cat C-1116

WAS $56.95
NOW $29.95

Huge Mobile Saving!

Here's value! The MMB-21 Mobile Bracket to suit the FT-203/209/709 transceivers — and it's ½ PRICE!! Saves your equipment slopping all over the car and saves you money to boot. But hurry, they can't last forever at this LOW price! Cat D-3501

WAS $29.95
NOW $14.95

½ PRICE!!!

Below cost charger!!

Just what your mobile needs! The PA-3 Car Charger is intended for operating 10.8 volt transceivers from a car cigarette lighter socket. Includes charging as well as power and now it's BELOW COST!! Suits FNB-3 pack as well as older style transceivers.
Cat D-2899

SAVE OVER $32!
WAS $62.85
NOW ONLY $29.95

Hand-held Power Meter

The perfect way to check the power output of your hand-held — anywhere between 6 metres and 70cm!! Famous Welz brand so you know it's quality. Simply replaces your antenna and you get a direct readout of power!
Cat D-1343

This Power Meter FREE with all hand-holds sold this month!!!

JUST $29

Talk's Cheap!!

It's BELOW COST! The Yaesu YM24A Speaker Mic. An 8 ohm speaker and 2k microphone all rolled into one! The 6 pin plug suits all FT207/FT208 transceivers and the mounting bracket is attached to the mic. Cat C-1111

SAVE $25!
WAS $54.95
ONLY $29.95

More below cost mobiles!

We've done it again! The MMB20 mobile bracket is designed specifically for the FT757GX. Allows mounting in either standing or slung position with three different mounting angles!
Cat D-2949

JUST $29.95

DICK SMITH ELECTRONICS PTY LTD

YAESU'S MASTERPIECE: FT767GX

• All mode, all band super transceiver

Take a bow Yaesu! The FT767GX is everything when it comes to transceivers. If a transceiver could get up and dance this one would be the Prima Ballerina! The very latest in technology so you can drag in those illusive signals or to make sure your signal is heard above the QRM. All modes on ALL amateur bands, continuous coverage triple conversion superhet receiver, built-in automatic antenna tuner, die-cast aluminium and ducted cooling giving an incredible 30 minutes output at full power and much, much more! Try Yaesu at DSE — the advantages are easy to see!
Cat D-2935

Specifications
Receiver: 100kHz to 29.9999MHz, 50 to 53.999, 144 to 147.999, 430 to 439.999MHz
Transmitter: All WARC bands to 30MHz, VHF and UHF as above.
Output: 100W (AM 25W carrier) on HF, 10W (2.5W AM) VHF & UHF
Antenna Impedance: 20-100 ohms HF (nominal 50 ohms), 50 ohms UHF/VHF
Emission: J3E, A1A, J1B, A3E, F3E
Sensitivity: 0.25uV (SSB/CW/FSK, 1.5-450MHz, 10dB s/n/N)

DICK SMITH ELECTRONICS PTY LTD

JUST $4995
Includes 2m, 6m & 70cm and auto antenna tuner modules

Regd Address:
Cnr Lane Cove & Waterloo Streets, North Ryde, NSW. 2113 PH:(02) 888 3200

Amateur Radio

FRONT COVER: "Dawn at the John Moyle Memorial Field Day". The station of Peter Green VK5ZPQ, Andrew Russell VK5ZUC and John Brayley VK5AJQ, was operated 50 km south of Adelaide near Victor Harbour.

Photograph courtesy John Brayley VK5AJQ

Special Features

Beacons — Repeaters *by Tim Mills VK2ZTM* 54
Convention Report *by Bill Rice VK3ABP* 3
DOC QSP 25
Licence Cancellation 2
Morseword 3 *by Audrey Ryan* 47
News Report from London *By Tony Smith G4FAI* 24
The Time *by Jim Linton VK3PC* 20
VI5JSA — *Aeronautical Mobile by Jeffrey Thornton VK5BJT* 26

Technical Features

An Approach to Antenna Tuning *by Lloyd Butler VK5BR* 12
Building Blocks Revisited — *Part 2 by Harold Hepburn VK3AFQ* 8
Classic Communications Equipment *TR-AP-22 A Transceiver by Colin MacKinnon VK2DYM* 18
Junction Field Effect Transistor Amplifiers *by Don Law VK2AIL* 28
Power Line Interference — *A DOC Viewpoint by R D Champness & V H Pleuger* 4
SADCG AX25-X3 Protocol for use in Amateur Packet Radio *Part 2: by Steven Blanch VK2KFJ* 57

Regular Features

Advertisers' Index 64
ALARA 53
AMSAT Australia 46
AR Showcase
— *ESD Interference Simulator* 55
— *IPS User Courses* 55
— *Marine Radio* 55
Awards
— *Australian DXCC Updates* 52
— *Awards Issued Recently* 52
— *Ten Ten International* 52
Book Review — *Radio Frequency Interference Handbook* 42
Club Corner 54
Contests
— *HF Contest Championship Final Results — 1986* 42
— *RSGB Listener Contest* 42
— *YLRL Novice/Tech Day* 39
Editor's Comment — *Image Problems* 2
Education Notes 33
Equipment Review
— *Emtron EAT-300A Antenna Tuner* 32
— *Icom μ2A 2m FM Hand-Held* 30
— *Maplin Dipmeter* 17
Electro-Magnetic Compatibility Report — *TV & FM-BC Preamplifiers & their Problems* 58
Five-Eighth Wave 61
Hamads 64
How's DX 43
Intruder Watch 54
Ionospheric Predictions 63
Know Your Secondhand Equipment 34
Magazine Review 52
Obituaries — *Ivan Graham VK4QO* 62
Over to you! — *members have their say* 60
Pounding Brass 56
QSP 17, 26, 32, 51, 59, 62, 63
Radio Amateur Old Timers Club 49
Silent Keys — *VK2MA, VK2DW* 62
Solar Geophysical Summary 63
Spotlight on SWLing 51
Technical Mailbox 48
VHF UHF — *an expanding world* 36
VK2 Mini-Bulletin 62
VK3 WIA Notes 61

DEADLINE

All copy for inclusion in the August 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, June 19, 1987.

Amateur Radio

Published monthly as the Official Journal by the Wireless Institute of Australia, founded 1910. ISSN 0002 — 6859. Registered Office: 3/105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

Inquiries and material to:
The Editor,
PO Box 300,
Caulfield South, Vic. 3162.

Material should be sent direct to **PO Box 300, Caulfield South, Vic. 3162,** by the 20th day of the second month preceding publication. **Note:** Some months are a few days earlier due to the way the days fall. Check page 1 for deadline dates. **Phone: (03) 528 5962.**

HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with **strictly.**

VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

Production: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.
FAX:(03) 726 7059

Laser Scanned Colour Separations by: QUADRICOLOR INTERNATIONAL (AUSTRALIA) PTY LTD
3 Lake Drive, Dingley, Vic. 3172.
Tel:(03) 551 3333

Typesetting by: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.

Magazine Make up and Photo Reproduction by: EASTERN ADVERTISING PTY LTD
PO Box 558, Lilydale, Vic. 3140
Tel:(03) 735 5410

Photographic Film and Processing Material courtesy: AGFA-GEVAERT LTD AUSTRALIA

Printed by: LEADER WESTERNPORT PRINTING PTY LTD
1 University Place, Clayton North, Vic. 3168.
Tel:(03) 560 5111.

Mail Processing by: AUTOMAIL PTY LTD
14 Stamford Road, Oakleigh East, Vic. 3166.
Tel:(03) 568 6677

Editor's Comment

IMAGE PROBLEMS

In a radio-oriented journal like this, one might think the title would apply to a discussion about receiver intermediate frequency, whether the oscillator should be above or below the signal, and related matters.

But no! Numerous letters which have come to us over the last few months, mostly resulting from the request for opinions about our proposed handbook, have shown a widespread need among you, our members, for more information about the management of the WIA. One writer in particular would like to see much more published in AR of the discussions taking place at Executive meetings, and also at Club Conventions and Divisional Councils, not to mention Federal Conventions and meetings with DOC. A common theme is that these various discussions result in actions and decisions which affect all members, and yet few members even know what is being discussed. In most members' minds these management councils are seen as debating clubs, largely out of members' control, and from which few results or conclusions are ever seen to percolate down to the membership. This seems to be one image of the WIA; and if most of you share this image, then we do indeed have an image problem!

I'm sure the WIA is not unique among organisations in having such problems. On a small scale, it mirrors the representation of the people in State and Federal Parliaments. We, as electors, send our representatives to Parliament to defend our individual interests; but how many of us actually tell our MP's what we want? A very small minority may be stirred enough to write letters or organise meetings, but the vast majority simply hope for the best. As to what our MP's actually say in Parliament, how many of us listen to the broadcast debates? How many read Hansard? (Both State and Federal?). How many even read newspaper accounts of the more entertaining discussions? Most of us know little and care less. We depend on our MP's to know what we want, or even more clearly, what we don't want!

The WIA operates in a very similar way, except that we don't have live broadcasts, Hansard or newspapers. We do have weekly Divisional broadcasts, and we do have AR. If we ask the right people we may even be able to see the minutes of some meetings. But we do have a communications problem, basically because the amount of material to be reported is far more that can be handled by these means.

Each month, each Club, each Divisional Council and the Executive each produces minutes of its meetings. Club and Council minutes may cover two or three pages. Executive usually spreads over six or more. Every quarter Executive and DOC get together. Another six pages! Annually, each Club Convention (in the States which have them) may run to 20 or 30 pages. The Federal Convention record (complete with reports from all office-bearers) involves hundreds of pages. We are submerged in an ocean of paper. Yet most of you never see it! Does it matter?

Perhaps the important point is not whether or not you see all this verbiage. What is important is that it is there. You can always ask to see it. Even if you never do so ask, the fact that you can is an ever-present thought in your representatives' minds. All are potentially accountable to the membership. It may not seem very democratic, but it could be a great deal worse!

Bill Rice VK3ABP
Editor

LICENCE CANCELLATION

David Wardlaw VK3ADW, President of the Wireless Institute of Australia, today congratulated the Department of Communications on its successful action to help clean up the Sydney voice repeaters.

"It was unfortunate" said David "that a very small minority persisted in using foul and abusive language on air. Apart from being an offence under the Radiocommunications Act, it was a real abuse of the privileges of the Amateur Service."

David Wardlaw went on to say that many amateur operators were refraining from using repeaters rather than suffer the offensive behaviour.

The Wireless Institute's 51st Annual Convention has spent some time discussing this decline in behaviour on the Amateur Bands.

Advice was received that Mr Robert Lear VK2ASZ, was issued with a notice of cancellation of his licence on Thursday, April 30, 1987.

The Department of Communications have also expressed their concern about the level of anti-social behaviour by some amateur operators in Sydney.

"The Department of Communications has acted on our complaints" David said. "This is the first licence cancelled under the new Radiocommunications Act and on behalf of the Institute I would like to extend our appreciation for the work of the Radio Inspectors involved and we hope that this action will act as a deterrent to all those amateurs who wilfully disrupt repeater operations."

David Wardlaw said that the investigation had been conducted extremely quietly. "Todays announcement of the action taken is a real relief for those who were so upset and angry at the constant disruption to our hobby."

At the conclusion of the Convention discussions on this topic, the following resolution was carried unanimously:

"That this convention recommends:

(a) the Institute supports education in appropriate operating techniques and its conduct with training courses.

(b) the Institute publishes and distributes information statements on operating techniques and conduct. This information should, wherever practical, be incorporated within a widely available "Getting on the Air" information package.

(c) this Institute strongly recommends to its members to support the DOC in whatever manner in its efforts to control blatant and serious offenders against long standing codes of conduct."

(Signed) David Wardlaw,
Federal President,
Wireless Institute of Australia,
May 2, 1987

HIGHLIGHTS OF THE 51ST FEDERAL CONVENTION

Discussion of Examination Devolvement, Institute Structure to be Revised? Novices to be Granted use of the Two-Metre Band?

The 51st Federal Convention of the Wireless Institute of Australia was held over the first three days of May 1987 at the usual venue, the Brighton Savoy Motel, in Melbourne.

Each of the seven Divisions was represented by at least its Federal Councillor and one other delegate. VK4 and VK5 each had delegations of four people.

The Federal President, David Wardlaw VK3ADW, was Chairman. With the eight other Executive members, 29 people were involved in about 23 hours (excluding meal and coffee breaks) of exhaustive formal discussion of 16 reports from office bearers, 26 Agenda Items and the Budget.

Four other office bearers, plus sundry visitors were present part of the time and the Department of Communications was represented by Mr David Hunt, Manager Regulatory Section, Operations Branch, Canberra. Mr Hunt spoke for over an hour on Friday morning covering a wide range of topics, and was again present on Saturday, to answer questions.

EXAMINATION DEVOLVEMENT

Mr Hunt spoke at some length on the background to the DOC intention to divest itself of the financial burden of administering the amateur certificate examinations. Other organisations besides the WIA have indicated interest in this area. Subsequently, most of Friday afternoon was spent debating this topic, and a great deal of guidance was provided to Executive in its continuing negotiations with DOC.

One contentious item had been that examination of licence candidates in Morse code sending be deleted from the requirements. This was defeated, one valid point being that both receiving and sending qualifications are required by the ITU regulations.

The result of this debate was that Executive was instructed to seek accreditation as an examining authority, possibly as the sole authority, and if successful in obtaining accreditation, that an examination co-ordinator and committee be established.

DOC VIEWS ON OTHER TOPICS

In Mr Hunt's Friday morning address, he high-lighted a number of aspects of administration of the Amateur Service. These were:

a The effective and positive consultation between DOC and WIA which has contributed to the increasing self-regulation of the Service.

b A need for the WIA to respond quickly in presenting its viewpoint on controversial or provocative issues to the Department and the media.

c Commercial pressure on the RF spectrum and need for the Amateur Service to justify its requirements.

d Firm prohibition of amateur soliciting for Third Party Traffic except in emergencies.

e Undesirability of individuals attempting to negotiate with overseas governments rather than through the normal WIA-DOC and thence diplomatic channels. Individual action could be counter-productive and might lead to loss of privileges.

f The computerised Spectrum Management Information System (SMIS) being introduced by DOC, and its effect on issues such as licence terms of more than one year and the allocation of call signs. No long term problems are anticipated, but there could be some "transitional hiccups."

STRUCTURE OF THE WIA

Many thoughts were expressed during a lengthy discussion of the complexities and inadequacies of the present Federal/Divisional Structure, with the Divisions all differing in their own organisation, as to the mix of Zones, Branches and Clubs, and the degree of management centralisation. The discussion was initiated on a motion by VK3, and seconded by VK4. Reference was made to the recommendations of the 1976 Arnold Report, and it was agreed that most of these have been followed, except for structural reorganisation. The motion arising directs the Executive to review the Institute's role, aims and objectives, structure and management in detail, appointing a consultant if necessary.

FINANCIAL SITUATION

The report of the Treasurer, Ross Burstal VK3CRB, indicated impending problems, mainly due to the rapidly increasing costs in the magazine publishing area together with decreasing advertising revenue. Membership is also tending to decrease. A sub-committee met on Saturday afternoon to review the problems of producing AR and its recommendations will be covered in the Editorial for next month. The Budget for 1988 was presented, showing an overall anticipated deficit of figures $10 000. It is to be hoped that the reality will be much less, but it was appreciated by all that this would only happen by reducing expenses and increasing membership.

FEDERAL OFFICE

The newly appointed General Manager, Mr Tony Heawood, was present throughout the Convention and was certainly "thrown in at the deep end" by being introduced to the management of the WIA at this annual peak in its activity. The necessary action to implement many of the Convention recommendations will be his responsibility. Unfortunately he will not have the benefit of an executive assistant as was proposed by one agenda item, due to the stringency of the financial situation. Nevertheless, the experience of his two part-time assistants, Mrs Ann McCurdy and Mrs Helen Wageningen, will help greatly, and the President commented in introducing his report that the Institute was fortunate in their ability to "hold the fort" after the previous manager, Earl Russell VK3BER, was forced to resign on medical advice.

NOVICE PRIVILEGES

At last year's Convention, a proposal to permit Novice licensees use of a portion of the six-metre band was discussed and referred to a committee, but no further action has occurred. Two items submitted by VK3 this year were that negotiations commence immediately regarding a six- metre allocation, and that the possibility of a two-metre allocation be discussed. An important factor is that under recent reciprocal licence arrangements with Japan, it is possible for Japanese visitors having a grade of licence below VK Novice standard to operate on two-metres, from which VK Novices are excluded.

During Mr Hunt's question and answer session this situation was discussed. For reasons mainly involving interference it was indicated that DOC would prefer to see an expansion of two-metre activity rather than six- metre. Influenced by this viewpoint, the Convention decided, after considerable discussion, to drop the request for six-metres, and to support one for two-metres. Supporting speakers mentioned the need to encourage candidates for the Novice licence and that a voice-FM privilege would attract many present UHF CB operators. From this discussion a motion arose that DOC should be approached immediately for extension of Novice privileges to include the 144-148 MHz band with all presently authorised Novice modes and power limits plus voice-FM. This was carried, with only VK1 dissenting, and a letter of request was immediately drafted.

CALL BOOK IDENTIFICATION

Last year the Convention decided that Call Books should include an identifying mark for members of the WIA. It has become apparent, since its implementation, that many amateurs, both members and non-members, are embarrassed by this identification. Some have not only complained to the Institute but to DOC. In response, this year the Convention voted, only VK5 dissenting, to rescind last year's decision.

FUTURE OF AMATEUR RADIO

Discussion under this heading and also that of Forward Planning was extensive. Many speakers contributed their ideas over a period of about two hours on Sunday morning. Such aspects as age distribution, financial limitations in a family context, competing attractions (computers, etc), lower permits (and refusals), public relations, need for Morse code, and many more, were debated at some length. The result was a comprehensive set of guidelines for future action by the Institute.

CONCLUSION

This report has been prepared quickly, and may have therefore omitted some important areas of discussion. Many items of limited and specialist interest have had to be left out due to space constraints.

We hope, nevertheless, that this account has been of use to most members. If you want to know more ask your Federal Councillor, and most urgently, if you know people interested in electronics or CB, introduce them to amateur radio.

If you know amateurs who are not WIA members, tell them what the Institute can do for them and persuade them to join. More members will solve all our problems.

Report compiled by Bill Rice VK3ABP

POWER LINE INTERFERENCE — A DEPARTMENT OF COMMUNICATIONS VIEWPOINT

R D (Rodney) Champness

V H (Volker) Pleuger

Introduction

With new technology comes new techniques for overcoming related interference problems. There are, of course, many potential sources of interference in our complex, technically-orientated society which can involve mechanical, electro-mechanical, electrical and electronic devices — all of these are capable of producing unwanted radio frequency energy. Of these sources, it is a fact of life that power line interference (PLI) constitutes more than 50 percent of all complaints received for investigation each year by DOC in all States.

DOC's current policy is to provide a cost effective service to the public, consistent with available resources in identifying sources of interference. The diagnosis in and location of PLI is complex and time consuming, resulting in a great deal of DOC's limited resources being used in this activity. Regrettably, it is impractical for DOC to investigate cases of PLI to the amateur service, unless there is the presence of significant interference to broadcast or television reception from the same source. All interference complaints may be lodged at any of DOC's Radio Frequency Management Offices throughout Australia.

It is an unfortunate fact that all power lines radiate radio noise. It must be regarded as impossible to prevent radio interference from power lines entirely, if not from a technical, at least from an economic point of view. Satisfactorily resolving PLI and other interference problems is often a matter of effective negotiation and education. In this context it is pleasing to note that the activities of the WIA's EMC committee and other contributors of constructive magazine articles can only enhance the understanding of interference problems in general.

In the following article on PLI, we will be discussing primarily the Victorian situation, for the sake of convenience. While there may be some differences of power line construction and climate among the States, these should not significantly affect the basic problems encountered.

High Voltage Power Line Interference

Overhead high voltage power lines have been a significant source of interference to radio, television and radio communications reception for many years. The current interest in the continuing problems of PLI has prompted the need to further enhance an understanding of such problems. The following article looks at how the interference is generated and the present methods of detection and interference reduction, including how modern construction trends on High Voltage lines are minimising interference.

DOC's Radio Frequency Management Division is responsible for detecting sources of interference to broadcasting and radio communications services. Once a particular interference source is located, DOC advises the owner of the offending equipment and suggests what remedial work is necessary to overcome the problem. If required, the equipment owners are assisted on site to successfully suppress the offending equipment. Such assistance may be needed since interference suppression can become quite complex. Recently, DOC has been working with the Standards Association of Australia on particular standards which, when introduced under the *Radiocommunications Act 1983*, will help to progressively reduce interference levels.

DOC's interference investigators, called Radio Inspectors, identify sources of PLI and recommend remedial action to the relevant power authority. At least 90 percent of PLI is generated by sparks, that is, interrupted arcing, in the variable leakage paths between phases, sometimes via the earth or neutral conductor on the high voltage reticulation system. It should be understood that when referring to 'sparks', the start and finish of each 'arcing burst' is the responsible mechanism for the interference heard. Incidentally, it is a widely held misconception that common arc welders cause interference. This is just not so. Arcing, when such welders are in use, is normally continuous and is quenched in any case. Power line voltage fluctuations may, of course, occur, and in severe cases could cause some instability in appliance operation when the line voltage regulation is poor. In fact, only the more sophisticated 'pilot arc' welders can cause interference. Usually these would be found only in industrial premises.

Voltages of 6.6, 11, 12.7, 22, 33 and 66 kV are variously used in Australia to distribute power around suburbs, towns and rural areas before being transformed down to 240-415 volts AC. The main feeder reticulation systems are usually 220, 330 or 500 kV, and these will be disregarded in this article as PLI problems on them affect relatively few people. The most common high voltage power lines in Victoria are 22 and 66 kV. They share similar construction techniques with the most obvious differ-

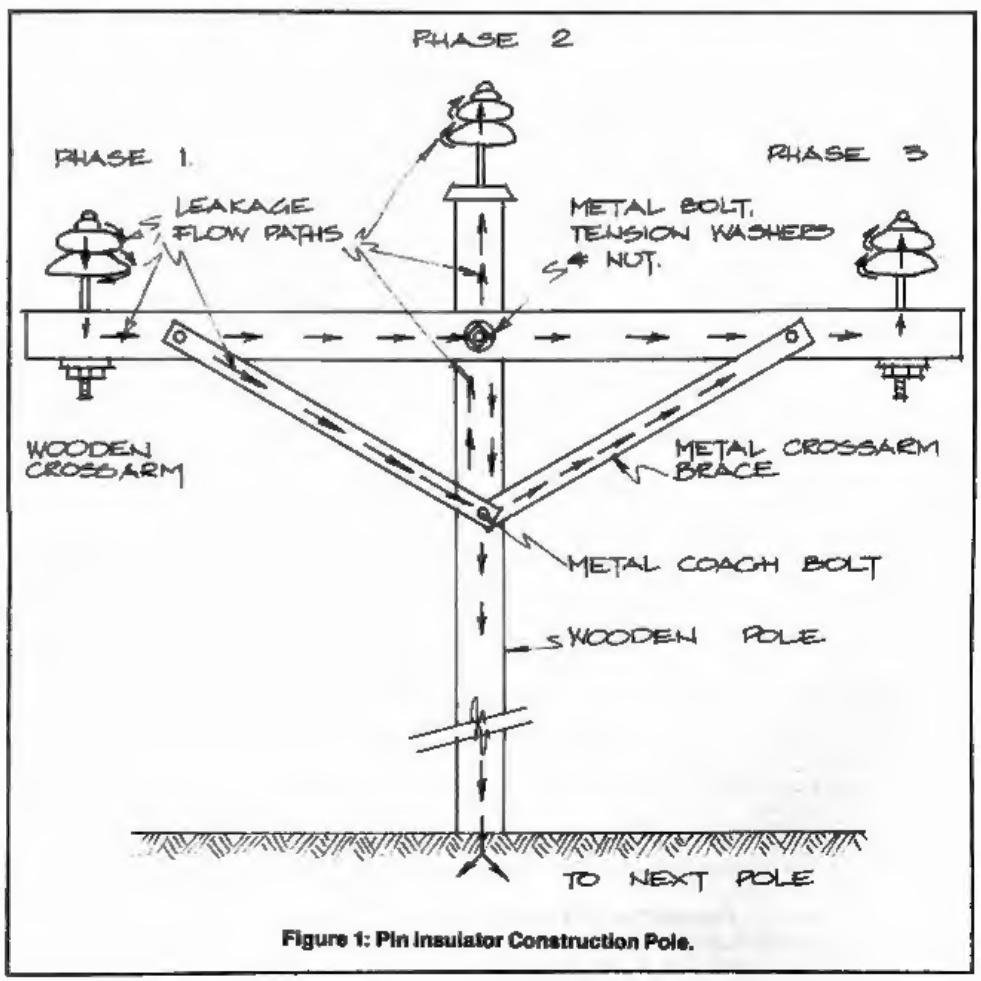


Figure 1: Pin Insulator Construction Pole.

ence being in the size of the insulators (See Figure 2).

By referring to Figure 1 and the following information, it will be clear how most high voltage PLI is produced. No insulator is perfect. Recognising this makes much easier an understanding of how interference is produced. Since no insulator is perfect, it is clear that a small current flows between each high voltage phase. This current will combine purely resistive current and 'capacitive' current components. Figure 1, shows the leakage paths from phase one to the other two phases as an example. Contamination on the surfaces of the insulator or a faulty and possibly cracked insulator, will increase this leakage current quite significantly due to a reduction in the resistance across the insulator. This leakage, in itself, does not cause interference. Interference will only be caused when there is some discontinuity in the leakage path or paths. Where this condition occurs, sparks will jump across the gap and thus interference is produced. The interference level is governed largely by the level of the leakage current peaks.

The typical high voltage distribution pole as shown in Figure 1 is mostly made of wood, with a wooden cross arm and metal braces. The insulators in this type of system are mounted on metal pins which are bolted to the cross arms. When first installed, all of the 'hardware' that is nuts, bolts, braces, and so on, is tight, so it is unlikely that any discontinuity will exist in the leakage paths. However, in time the wood shrinks and the whole of the structure at the top of the pole will become loose. Additionally, the metal-work will corrode and will have some contaminates on its surface as well. These may act as poor quality insulators, usually at reasonably high insulation resistance, but with low dielectric strength.

Since the leakage currents travel throughout the high voltage structure, as shown, it should be clear now that at some points where there is a looseness in the structure, discontinuity in the leakage path can occur.

A similar phenomenon can be observed when plugs and sockets on electronic equipment are loose, with resultant crackles and variable performance. The effects of corroded connectors in antennas are well-known. A check of continuity across such corroded connectors shows that the resistance varies from about zero, when making good contact, to a very high value if the corrosion is the only path for the ohm-meter testing current.

Returning again to our power pole line support structure, it is obvious that hardware looseness acts very much like the poor join in the antenna. However, the signal voltages on the antenna are low, whereas the voltage across any part of the loose hardware on a power pole, where an open circuit exists, rapidly reaches several thousand volts. If the spacing across the open circuit gap is not great, sparking will occur at a rate of 100 times per second or twice 50 Hz, which accounts for the two bands of dotted interference lines sometimes seen on a television screen. A single leakage path from one phase to earth may also produce a single band of dotted lines on a television screen. In the most severe case of leakage between all phases, up to six noise bands may be seen theoretically, although it is more likely that these would merge in practice and be seen as one very broad interference band covering most of the screen.

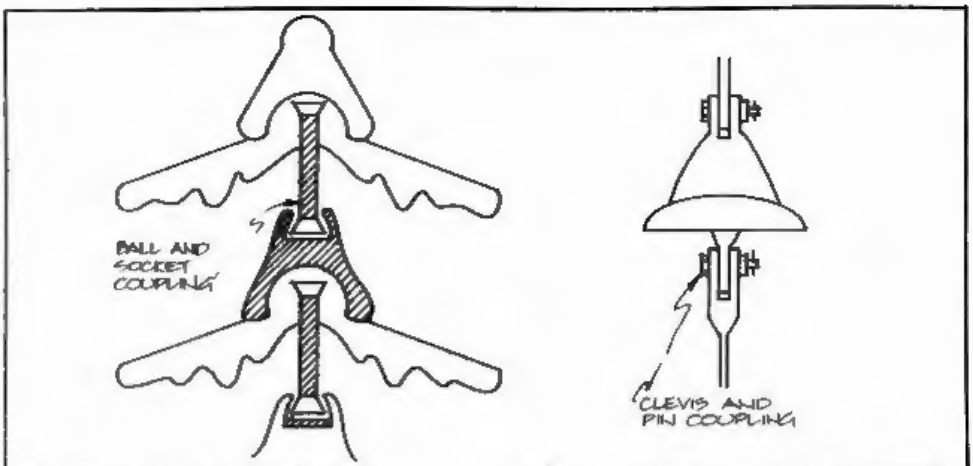


Figure 3: Types of Flexible Couplings. The flexible coupling being either the ball and socket or the clevis and pin are designed to move as the line moves under the windy conditions, they also provide for ease in line construction. Unfortunately, the metal to metal coupling collects surface deposits of oxides and dust which builds up an insulating layer around them. The electric field between the metal coupling endeavours to complete the circuit and a spark is formed. The movement of the line in windy conditions results in an intermittent 'Zapping' as the coupling contact is made and broken. Disc insulators used on slack spans and intermediate poles are more troublesome because of the low mechanical tension applied to the metal coupling.

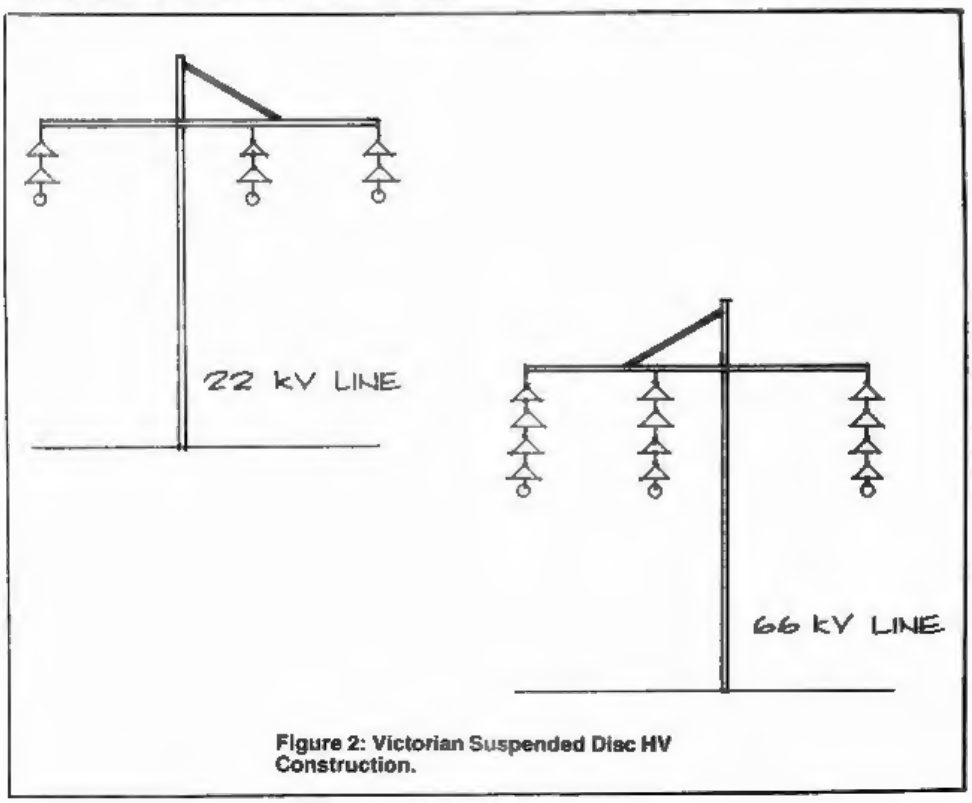


Figure 2: Victorian Suspended Disc HV Construction.

Another common type of high voltage construction which causes considerable interference is the suspension disc insulator type construction (see Figure 3). This system is often used on both 22 and 66 kV lines. There are usually two disc insulators on 22 kV lines per phase and four disc insulators per phase on 66 kV lines where wooden poles and cross arms are used (see Figure 2).

Disc insulators are joined together, either by flexible ball and socket joints with a retaining 'W' pin, or clevis and pin coupling. This is a 'loose mounting' arrangement and, as such, it is free to move with wind pressures and so on. This freedom of movement in the assembly of these disc insulator strings, makes them prime sources of interference due to the numerous potential discontinuities in the flexible couplings between insulators. In cases where the mechanical strain on such coupled insulating systems is great, the potential for PLI is reduced since a reasonably reliable and continuous contact between couplings can be maintained.

It should be mentioned that, where possible, Victoria's power line authorities are often replacing the more troublesome disc construction poles and sometimes wooden poles, with ferro-concrete poles. Usually these have metal cross arms and the modern ribbed-post insulators mounted on them, thereby overcoming any of the interference problems ascribed to loose hardware and coupled disc insulators. Having explained the mechanics of how most cases of PLI are generated, the methods of interference detection now will be described.

Tracing Interference

The first step in tracing interference is to make sure that the affected receiver and associated antenna systems are in good order, as received

interference problems are often made worse by antenna deficiencies. Once satisfied that the receiving installation is in good order, the next step is to observe the interference. If it is not present at the time of the visit, the Radio Inspector will endeavour to find out the nature of the interference and when it is likely to reappear by analysing the symptoms and obtaining information from the complainant. Video or sound recordings of the effects can often assist in this process. It is important to know when the interference is likely to be present, as some interference occurs intermittently. 'It stopped just before you came' or 'It came on just after you left last time' are common statements made by people who suffer interference to their reception.

Having determined that the interference is externally generated and likely to be due to high voltage power lines, the DOC officer listens with instruments located in his vehicle, usually at the highest frequency on which the interference is still detectable with the relevant radio or television frequency band. Sometimes the DOC officer cannot detect a particular interference because the antenna on his vehicle is, obviously less efficient than one installed on the roof of a home. It is necessary then to move to a location where interference can be heard and to locate the most likely source of the interference if multiple sources are detected. It can be quite difficult to locate the correct source of interference when it is not heard outside the DOC vehicle. The experience of the DOC officer will mean that in most cases the correct source of interference however can be found. The greater the overall sensitivity and bandwidth of a receiving installation, due to a combination of high gain antennas, low noise receiver and perhaps a masthead amplifier, the more likely it will be prone to interference, whether its source is PLI, CB or amateur transmitters. In country areas, where reception from capital city television stations may be quite marginal, use of a low noise masthead amplifier means that the distance to the interference source could be a kilometre or more, while some high frequency interference sources may be several kilometres away. The effects of a nearby narrow spectrum radio frequency interference source such as a CB transmitter can, of course, be overcome by fitting a suitable radio frequency filter at the input to the masthead amplifier and the television set.

Interference Intensity

The intensity of the interference will vary with the distance from the source as shown in Figure 4. Interference at medium frequencies may be heard for many kilometres along a power line with no clearly defined peak. There may be standing waves however which can give the impression that the peak has been found, when in fact, the actual peak is some considerable distance away. By comparison, in the Ultra High Frequency (UHF) region, interference may only be heard over a distance of a few hundred metres when using high gain antennas and sensitive receivers. This makes tracing the interference source much easier and more positive, providing the actual interference does in fact have a UHF component. As a general rule, interference peaks are more pronounced the higher the frequency range affected.

Having determined from where the interference emanates, various methods are used to isolate the source. These methods may involve shaking a guy wire or gently tapping a high voltage power pole with a wooden maul, while listening for any change in the interference level or tone on the detecting receiver. In some cases it is necessary to determine whether the interference is on the 22 kV or the 66 kV reticulation system, as these can be mounted on the same pole and two groups of linesmen can maintain the systems separately. Determining which line is at fault in such cases is difficult but can be accomplished by using UHF Radio Frequency Interference guns; Very High Frequency (VHF) beams and interference location receivers; or in some cases, an ultrasonic detector. Skill is needed to detect the slight difference in sound and interference level which gives a Radio Inspector that vital clue to accurately locate the problem. It is, of course, possible that both lines are causing interference simultaneously.

Ultrasonic Detectors can, at times, be ideal for determining the exact location of PLI. However, it is often found that interference is present on a pole which gives no ultrasonic output at all. Conversely, an ultrasonic output can be heard from a pole from which no significant radio frequency interference is emanating. The ultrasonic detector hears the ultrasonic component of a spark. If this spark is within direct 'visible' range of the detector, it can be heard. However, if the spark is obscured inside an insulator, behind a cross arm, or on top of the cross arm, it will not be heard.

Clearly, such a unit can be a very handy device when used in conjunction with radio frequency detection instruments to verify a PLI source, but should not be relied upon in every case.

Having identified the problems on a specific pole, it is then necessary to advise the relevant electrical supply authority of the corrective measures needed to overcome the interference. With installations as shown in Figure 1, tightening the hardware at the top of the pole will usually overcome the problem. As the timber shrinks and expands from summer to winter, it is recommended that conical spring washers be used under each nut of the mounting hardware to maintain tension and hence reduce the likelihood of recurrence of PLI from this source.

Overhead high voltage power lines, using disc insulators in the suspension mode where physical tension between each insulator is low, are highly likely to generate interference. The lower the tension on the ball and socket joint or clevis and pin joints the higher is the likelihood of interference being generated. Single Wire Earth Return lines rarely generate PLI since the disc insulators are being used normally, that is, under significant mechanical strain.

To overcome interference generated by looseness of the disc insulator assemblies, power authorities commonly fill the coupling with conductive graphite grease or silicon grease. This grease is difficult to insert and has a relatively short life, preventing interference for a few months only. Disc insulators, with a bonding strap connected across the flexible couplings, have been used with success, but are not seen very often. It is economic to replace all existing disc insulators with the bonded variety to overcome the problems of interference.

A more successful method of interference reduction introduced in the last few years involves stainless steel brushes about 2 cm in diameter and about 3 cm long, looking much like small bottle brushes. These are inserted into the disc insulators flexible ball and socket joints. The ends of the brushes are sharp and hard, biting through the corrosion, thereby making good contact between the adjoining ball and socket. They are easier to install and usually last several years without falling out of the joint. They are very effective at eliminating interference. *The use of these brushes, together with conical tensioning washers, has proven to be the most effective remedial measure against PLI on existing power line systems over the last 10 years or so.*

As mentioned earlier, there are also some new construction techniques which do not produce interference. Namely, the use of reinforced concrete poles, with metal cross arms and ribbed-post type insulators, along with some simplified constructional techniques. In some areas, underground power systems are used as well. These have been gradually coming into use over the last 10 to 12 years. With the improved remedial methods of overcoming interference on existing high voltage power lines and the new types of construction, interference is being brought under control gradually.

Once the DOC Radio Inspector determines the source of interference, the electricity supply authority is advised in writing of the recommended corrective action. If necessary, electricity supply authority linesmen and a DOC Radio Inspector will attend an interference problem together. This occurs where a very severe PLI problem exists, or when something out of the ordinary may be causing the interference. A number of live-line crews

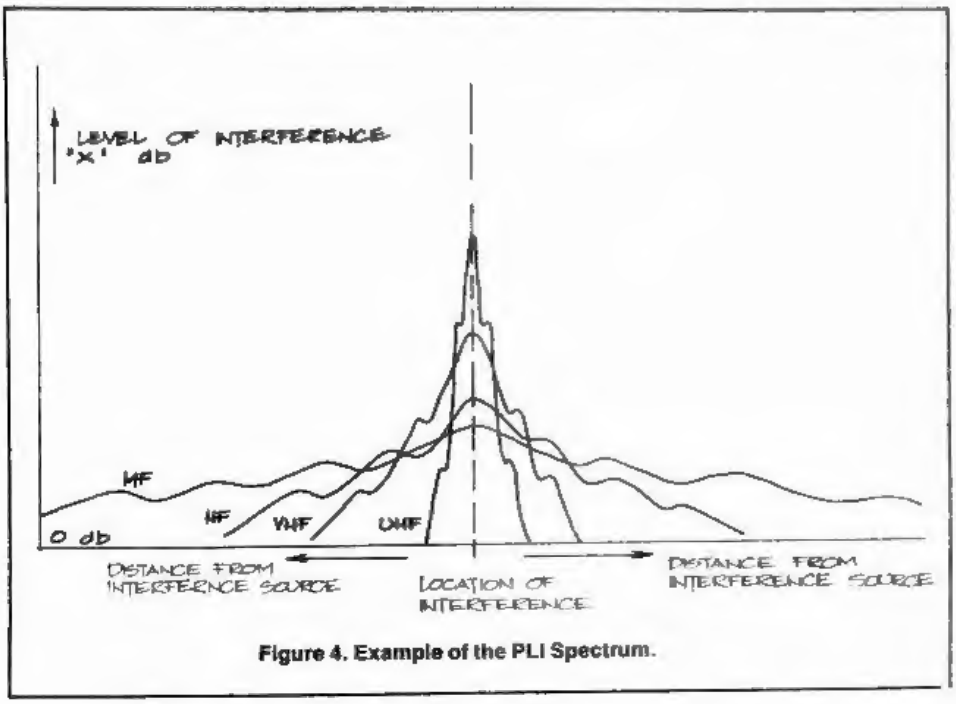


Figure 4. Example of the PLI Spectrum.

have small VHF air band AM radios or small portable television sets, which assist them in assessing the efficiency of their interference suppression work.

For example, it may be found that pole number 335 is causing the interference today. Tomorrow it may be that the neighbouring pole, number 334, is causing interference. The next day neither pole, but the following day, both poles are causing interference. Various tests may be conducted and neither pole may radiate interference when tested, although most poles can be persuaded in dry conditions to produce interference. For these reasons, it is possible for a DOC radio inspector to 'miss' some interference even though he has found interference on a number of poles. When this happens the person reporting the interference wonders, whether, in fact, the DOC Radio Inspector has found the interference and whether the electric supply has, in fact, fixed the fault. In reality, of course, the interference found at the time, has been fixed and another source has developed subsequently. This does happen, and quite often. It is possible to advise the electricity supply authority of many poles likely to be emanating some PLI from time to time.

It is, however, not cost effective for the supply authority to be going around tightening up every loose nut or bolt on every pole within a kilometre of a viewer or listener on the off chance that it might case interference. Often poles are found that have considerable loose hardware on them which have never caused interference and so there is no point in reporting them. In these instances, the leakage paths obviously suffer no discontinuities and therefore no interference is generated.

The most common sources of interference on overhead high voltage power lines have been covered in this article. Before concluding, however, we should look at a few lesser known problems, and explore a few facts and fallacies.

On Single Wire Earth Return lines, most interference can be attributed to defective surge diverters or lightening arrestors. Due to the style of construction on these lines, loose hardware rarely causes a problem. Disc insulators, being under so much tension in these circumstances, make reliable contact via the couplings. The leakage path therefore is continuous.

While other wires, such as Telecom lines, are common-poled it is quite possible to induce many thousands of volts into them. Consequently, poor joins or leakage paths in these or similar nearby wires, can create interference just like the leakage paths on high voltage lines.

On the lower end of HF bands it is quite possible to hear interference many kilometres away from power lines, either by direct radiation or by reflection from the ionosphere. The power lines may contain resonant lengths at HF frequencies, and therefore are very good radiators. Under these circumstances interference is unlikely to be found directly, but in the course of solving someone else's interference, perhaps some severe television interference, it may be solved.

Interference from high voltage power lines may be detected over a wide range of the electromagnetic spectrum from quite low frequencies — up to many hundreds of megahertz. The upper limit is not known, although PLI is very rarely heard above 500 MHz. In general, PLI will peak at around 40 MHz.

PLI may be conducted for many kilometres along a line and low frequencies will not radiate a great deal at any one point, but will travel only a short distance at VHF frequencies along the line, and radiate most strongly very near the interference source. At low frequencies the line acts as a transmission line that is slightly lossy, but at VHF it acts as a very lossy transmission line.

PLI due to corona discharge occurs more so on higher voltage lines, and is exacerbated by any sharp projections on the line, such as upright cable-end tail. It is not a major cause of interference, and when heard on radio, is softer than normal interference, generally increasing the background level of interference, in an area.

Often PLI will increase towards and during the early evening and then will suddenly stop. At nightfall, moisture or dew will form on the insulators and PLI from the whole high voltage supply line structure will increase due to the reduced resistance of the leakage path between phases. In time the moisture penetrates into the areas where sparks occur and bridge the spark gaps, quenching the sparks and hence, the interference.

Transformers, which are normally very visible, are often blamed for causing all manner of interference, yet they are remarkably trouble-free. Only a handful are found to be defective in any one year; sometimes none at all. However, due to the quantity of hardware on poles carrying transformers, the likelihood of interference on such a pole is certainly increased. Interference caused by power transformers can occur throughout the normal radio and television frequencies or may only be detectable up to a few megahertz.

Finally, we should not forget that related to high voltage PLI are interference problems caused by neon or sodium street lights and their associated automatic switching systems. When these lights are near the end of their service lives, they produce an interference characteristic, which can be radiated or conducted via power lines and may severely affect broadcast radio and, sometimes, television reception. Domestic fluorescent lights can, of course, cause the same interference problems, which may be overcome by fitting appropriate suppression components. The more usual course of action is to replace the offending lights because they will have lost efficiency. Equally, interference can be caused by the street light sensing switches, commonly known as photo-electric cells, which control the lights depending on ambient light conditions. These photo-electric cells may become faulty, like a thermostat, and fail to switch correctly or remain in an arcing condition.

Postscript

This approach to interference problems and prevention has had to be fairly broad. No doubt it will be apparent that many sources of RFI exist in our modern society, apart from high voltage PLI, which are likely to affect us individually at some time.

These sources include:

- Computers, calculators and microprocessor/controlled business or domestic machines.
- Citizen Band, commercial radio communications or amateur radio services.
- Industrial process control and radio frequency systems, including medical radio frequency heating systems, for example diathermy machines.
- Common domestic equipment, such as small electric appliances and tools, even some solid-state temperature control systems used with water beds.

DOC's role is to equitably manage the shared use of the radio frequency spectrum for the common good. This means that there need to be reasonable rules concerning the levels of wanted and unwanted radiation from devices capable of transmitting radio frequency, as well as standards of immunity against the unwanted effects of radio frequency. Electromagnetic compatibility between electronic devices operating in a reasonable proximity to each other is obviously important. *For this reason DOC already has a number of technical standards, applicable mainly to radio-communication systems under the Radiocommunications Act 1983 to, among other things, control interference problems.*

Interference suppression can be complex or simple, but it is fair to say that all radio frequency interference can be suppressed or overcome in some way. However that's another story.

About the Authors

Volker (Vic) Pleuger is the DOC Radio Inspector for the Bendigo District, which covers the central, northern and north-western areas of Victoria.

He joined the Department in 1975, after having worked for 17 years with the radio and television broadcasting sections of the former PMG Department (now Telecom Australia).

Mr Pleuger was officer-in-charge of the DOC Radio Equipment Type Approval Laboratory, and spent a year as assistant manager, regulatory, at the Department's Victorian State Office.

He worked in various positions as senior technical officer and principal technical officer after joining Radio Frequency Management in the Department's Melbourne Central Office.

He was appointed District Radio Inspector at Bendigo in 1985.

In his spare time, Mr Pleuger is an amateur radio operator and assists with program production for a local community radio station.

He is married with one son and three daughters and lives at Faraday, near Bendigo.

ar

Rodney Champness is DOC Radio Inspector for the Benalla District, which is bounded to the north and east by the Murray River, to the west approaching Echuca, and to the south as far as Kyneton.

Mr Champness joined the Department in 1970 after working as a radio, television and two-way radio serviceman; radio supervisor in the Antarctic; and broadcasting station technician.

He has worked in the Radio Frequency Management area in the positions of: interference investigation officer; State Marine radio surveyor; Commonwealth marine radio inspector; equipment type test officer; and examinations officer.

Mr Champness was appointed District Radio Inspector at Benalla in 1977.

In his spare time he is an amateur radio operator who contributes articles on the subject to amateur radio magazines.

He is a member of the Wireless Institute of Australia (being a past member of the Publications Committee), and belongs to a local radio club.

Mr Champness is married with two children and lives in Benalla.

BUILDING BLOCKS REVISITED

— Part Two

Part 1 of this series described the background to the HF Building Blocks and listed the functions contained on each circuit board.

Harold Hepburn VK3AFQ
4 Elizabeth Street, Brighton, Vic. 3186

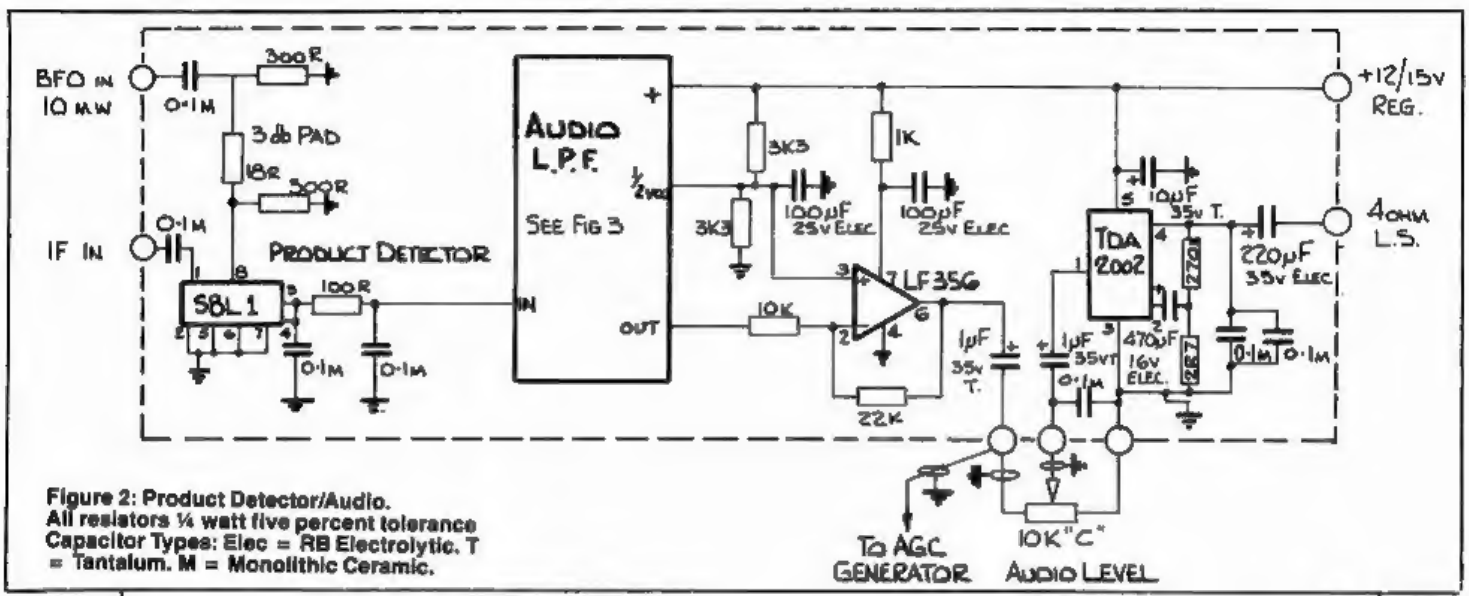
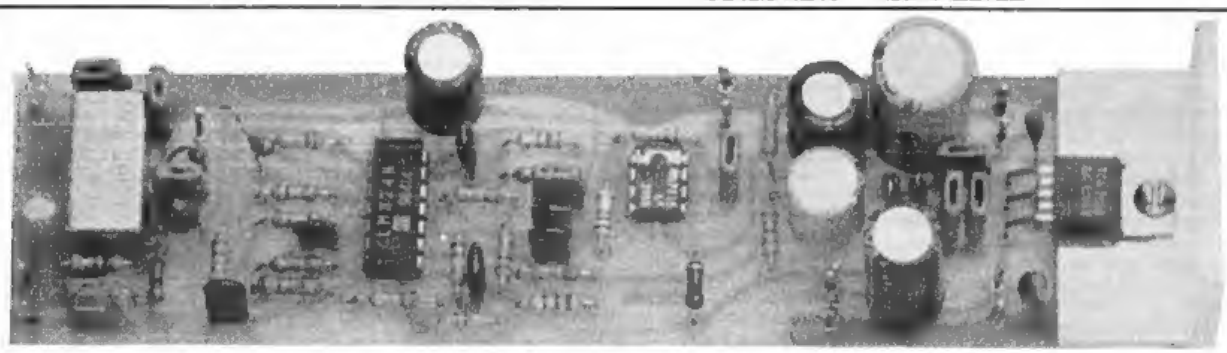
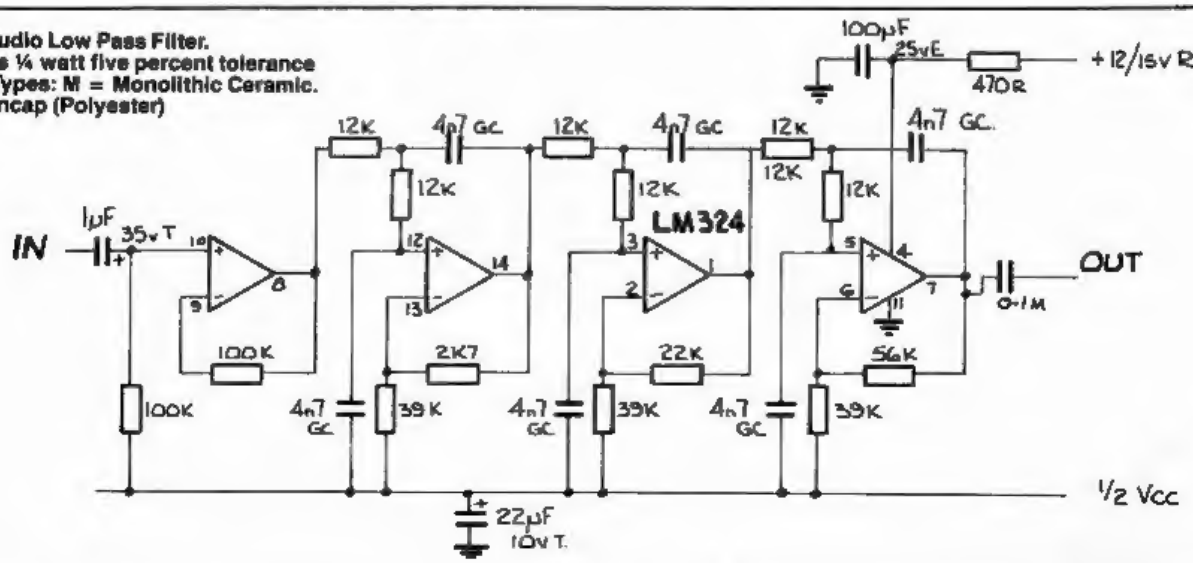


Figure 2: Product Detector/Audio.
All resistors ¼ watt five percent tolerance
Capacitor Types: Elec = RB Electrolytic. T = Tantalum. M = Monolithic Ceramic.



Made-up Product Detector/Audio Board.

Figure 3: Audio Low Pass Filter.
All resistors ¼ watt five percent tolerance
Capacitor Types: M = Monolithic Ceramic.
GC = Greencap (Polyester)



Each module will now be examined in detail, starting at the audio end of a receiver and progressing through to a transmitter power output stage.

MODULE 4 — PRODUCT DETECTOR/ LOW PASS FILTER/AUDIO

Figure 2 gives the circuit diagram of the module and Figure 3 the circuitry of the LPF. Figure 4, shows the component layout and Figure 5 gives details of the audio output heat-sink.

A — Audio stages

The audio stages consist of a LF356 FET input op-amp as a preamplifier and a TDA2002 audio output stage. This combination is capable of generating over 2.5 watts into a 4 ohm load with a 13 volt supply and over 4.5 watts into 4 ohms with a 15 volt supply. The nominal drive requirements in both cases, is under 10 mV RMS.

Whilst it is improbable that the full output capabilities would be required under normal listening conditions, the excess capability has some advantages. It provides insurance against gross distortion when conditions require a higher than normal output level, but more importantly, it guarantees low distortion levels under normal listening conditions.

This general approach of providing excess capability has been adopted throughout the series and contributes significantly for the performance of the finished product. The conventional amateur approach of tuning everything for maximum smoke has not been adopted!

The LF356 can be replaced with a CA3040 or any other op-amp having a FET input stage and a slew rate of around 10-12 volts per microsecond. The ubiquitous 741 should not be substituted.

The TDA2002 can be replaced with an LM383, but it may be necessary to modify the heat-sinking, if this is done.

B — Low Pass Filter

The audio stages are capable of a response to well over 100 kHz and unless some steps are taken to limit this, then the high frequency hiss generated in any IF amplifier and/or product detector will be faithfully reproduced, which will be unpleasant to the ear. Besides which there is just no point, in an amateur receiver, having audio components that contribute nothing to the information being conveyed.

For this reason a low pass filter having a "knee" of around 2700 Hz and a sharp roll-off thereafter has been included.

The filter design has been lifted directly from Don Lancasters excellent *Active Filter Cookbook* and is described as a six-pole maximum flatness filter. The active device is a LM324, a quad op-amp.

The first section is used as a buffer with the filter proper being built around the other three sections. With the component values given, it has a - 3 dB point of 2700 Hz and a roll-off approaching 35 dB per octave. Resistors of a five percent tolerance are the "norm" now-a-days and should present no supply difficulty. The six 4n7 greencaps should ideally be sorted out on a capacity meter, with the aim of getting them as close together in value as possible, say ± two percent. Generally, it has been found that if six identical looking units are chosen from the bin at the local emporium, it is highly probable they will have capacitance values sufficiently close to do the job.

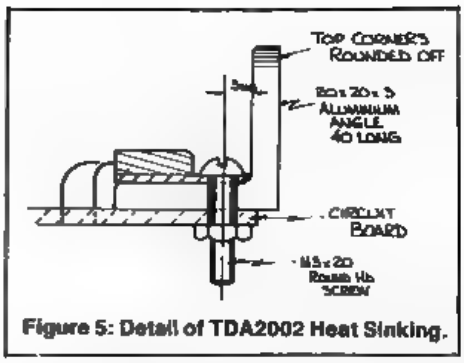


Figure 5: Detail of TDA2002 Heat Sinking.

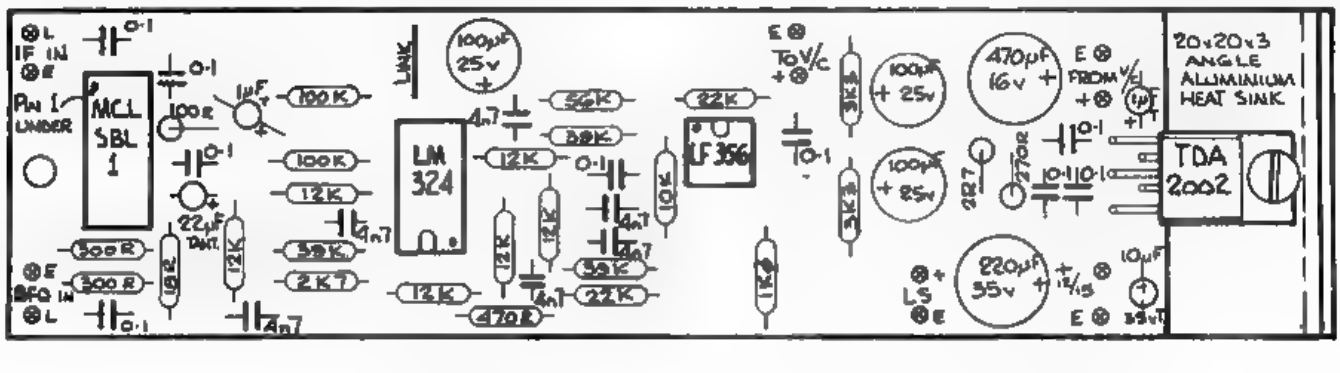


Figure 4: Component Layout on Audio Board.

The filter has an overall voltage gain of four times or around 12 dB.

C — The Product Detector

The product detector uses a Mini Circuits SBL1 doubly balanced diode mixer. These are in common use now-a-days as passive mixers at RF, and their good modulation and signal handling capabilities warrant their use in the product detector position. Provided they are terminated in 50 ohms at each port and the drive input requirements of 5 mW to pin 8 are met, the design will accommodate oscillator and signal input frequencies of up to 500 MHz.

The 3 dB resistive pad into pin 8 helps establish the required 50 ohm source impedance. The BFO is thus required to provide an output of 10 mW into 50 ohms.

Note that pin 1 of the SBL1, is identified by blue insulation on the underside. Pin 2 is under the M of MCL stamped on the top of the case.

CONSTRUCTION

It is suggested that the audio stages are first made and commissioned, then the low pass filter and finally the product detector.

Construction itself should present no difficulties and, provided the ICs are put in the right way around, polarities observed for the electrolytic and tantalum capacitors, and a check made for poorly soldered joints, the unit should work first time.

Access to an audio signal generator would assist commissioning. Alternatively the station's two-tone test oscillator switched to a single tone output, could be used as the signal source. Failing all this, the time honoured "wet finger" on the input will at least establish the unit is alive and working.

As a guide to those with adequate testing equipment, the LPF/Audio stages should give the following results:

Vcc	13.0 volts
Load	4.7 ohms
Input	8.0 mV RMS (1000 Hz)
Undistorted Output	2.7 watts
-3 dB points	260 and 2700 Hz
Response at -20 dB	55 and 4300 Hz

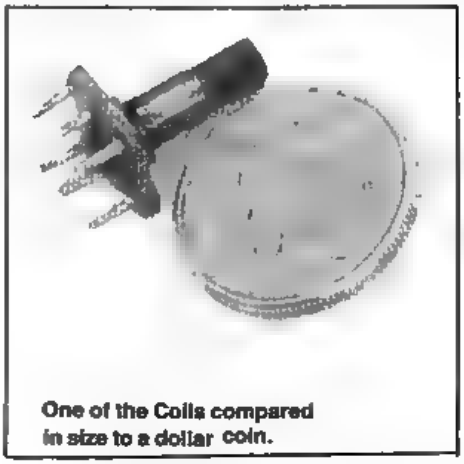
With the product detector in circuit and a 10 mW 8 MHz oscillator feed, the minimum detectable RF signal (background audio noise rising by 3 dB), was 15 microvolts at 8 MHz.

MODULE 6 — BFO/BALANCED MODULATOR/MICROPHONE AMPLIFIER

Figure 6 gives the circuit diagram, whilst Figure 7 shows the placement of parts on the circuit board.

Figure 8, gives the detail of an RF probe, which, in conjunction with the station multimeter, is an essential commissioning tool. It is recommended that this probe be made before trying to commission any of the modules.

The probe uses two hot carrier diodes in a "voltage doubler" circuit. The (pulsating) DC voltage developed by the diodes charge the 470 pF capacitor to some peak voltage. The 12k resistor acts as a load for the system. The DC across the load, is filtered by means of the 33 microhenry choke and 100 ohm series resistor. The screened cable connects the probe to the multimeter.



One of the Coils compared in size to a dollar coin.

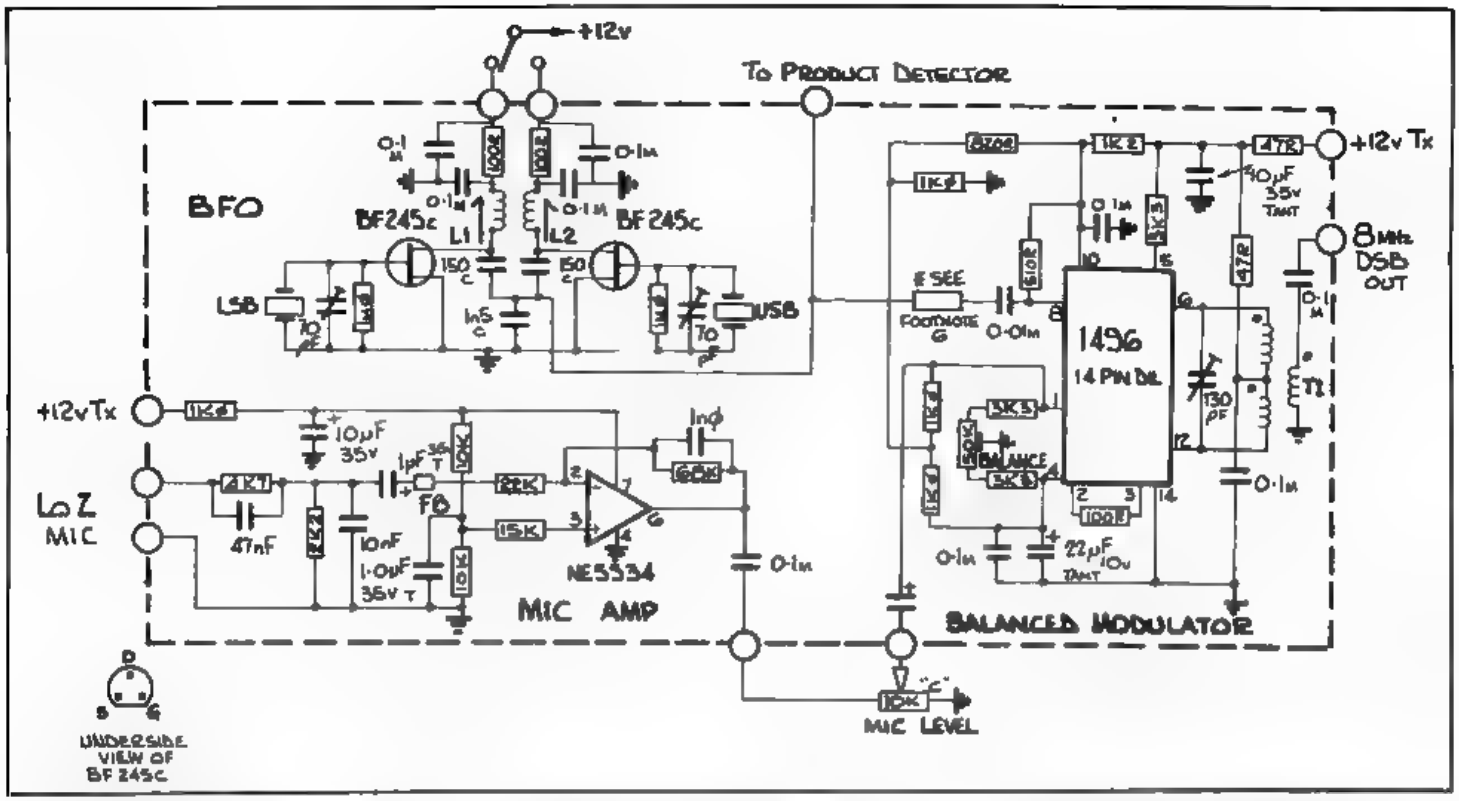
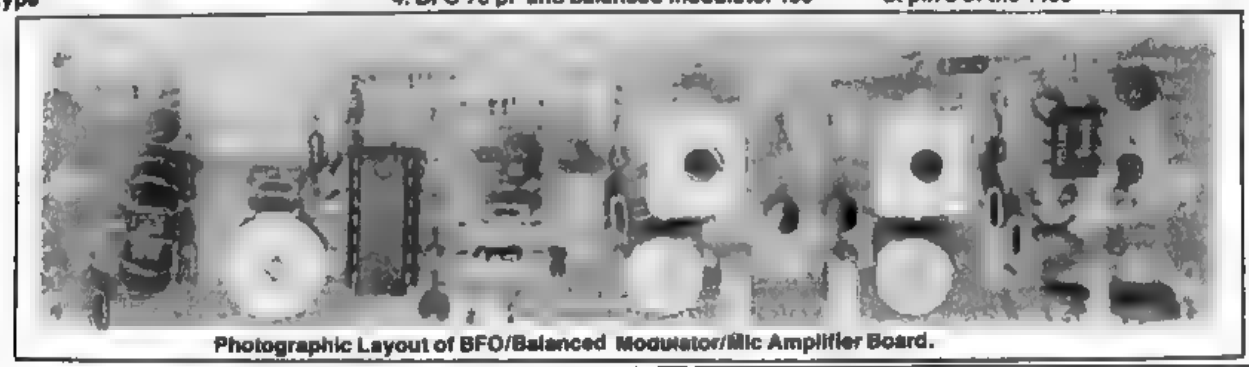


Figure 6: BFO/Balanced Modulator/Mic Amplifier.
1. All fixed resistors ¼ watt five percent. 50k balance pot is a 10 turn upright mounting, top adjustment, triangular lead arranged type
2. C = Ceramic Disc or Ceramic Plate. M = Monolithic Ceramic
3. L1/L2 — 27 turns No 32 B and S (0.25 mm) enamel, close wound on a Neosid Type A former with a F29 core
4. BFO 70 pF and balanced modulator 130 pF trimmers are Philips Type 2222- 808
5. T1 consists of 13 trifilar turns of No 26 B and S (0.45 mm) enamelled wire on Amidon 68/2 toroid
6. Nominal 1k5. Adjust to give 100 mV RMS at pin 6 of the 1496



Photographic Layout of BFO/Balanced Modulator/Mic Amplifier Board.

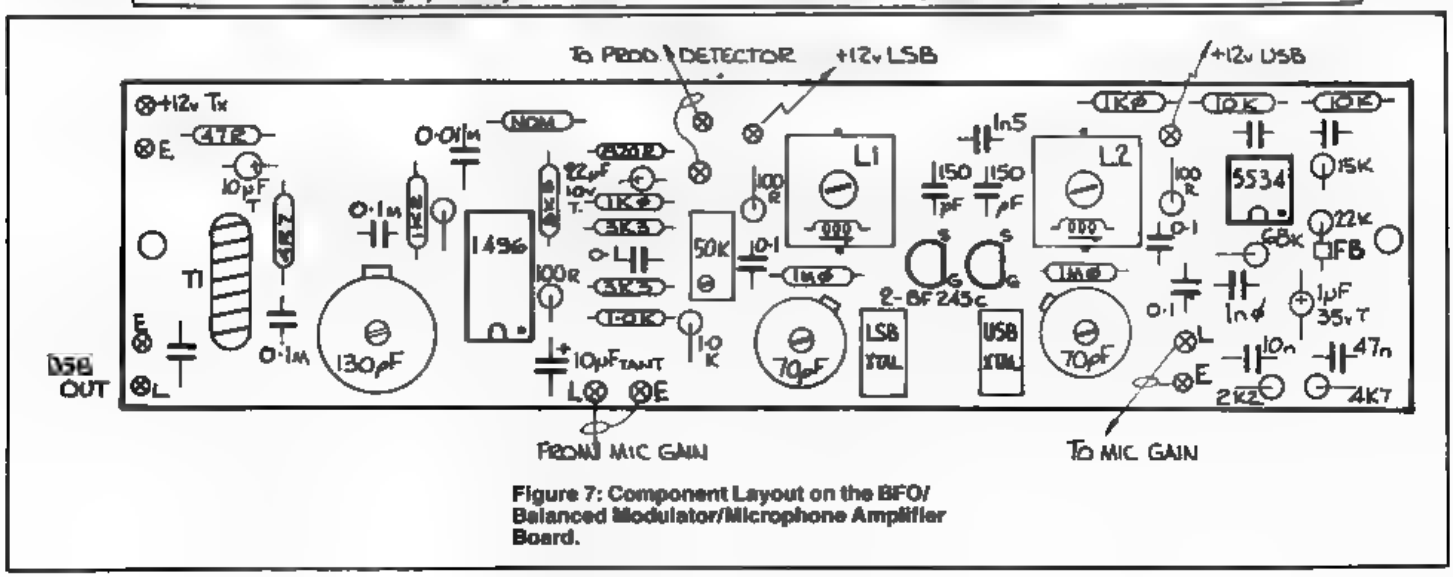


Figure 7: Component Layout on the BFO/ Balanced Modulator/Microphone Amplifier Board.

Note that this is not a precise measuring instrument at low RF levels, although it becomes so over about 1.5 to 2 volts RMS of RF.

The main purpose for recommending the device is to provide a simple and easy means of comparing the results found by the constructor with the levels specified in this series of articles.

The probe is made on a 6 x 0.5 inch (153 x 13 mm) piece of single-sided circuit board. This board is made by cutting the copper with a sharp knife and removing the unwanted copper between the lands by "stroking" with a hot soldering iron. The slightly raised edges of copper left by this technique are flattened down with the edge of a steel rule, the copper polished with fine dry steel wool and the now clean board given a light coat of protecting lacquer.

The components are soldered to the appropriate lands, using the minimum lead lengths. The screened cable is tied to the circuit board at a couple of points, to remove strain from the cable connections.

Germanium diodes may be substituted for the hot carrier diodes specified, with a small loss in sensitivity. Silicon diodes should not be used.

A — THE BFO

Since the IF frequency for this series of modules has been set at 8 MHz, the tuning component values given in Figure 6 are for this frequency. However, by changing the number of turns on L1 and L2 and/or the values of the 150 pF and 1n5 capacitors, the BFO can be put on any of the conventional IF frequencies such as 10.7, 9.0 or 5 MHz.

It is suggested that the BF245C FETs specified be used, mostly to ensure that the BFO develops the required 10 mW of power needed to drive the product detector on Module 4.

Selection of the required sideband is by switching the supply to the appropriate oscillator.

Output is taken from the junction of the 150 pF and 1n5 capacitors, as this point has an impedance approximating to 50 ohms.

To test the BFO, a 51 ohm resistor is temporarily connected between the output (marked "To product detector" on Figure 6) and earth. Using the probe described above as an indicator, adjust the coil tuning slug for maximum reading. This should be close to 1.0 volt DC.

B — BALANCED MODULATOR

A MC1496 (Motorola) or LM1496 (National) active double balanced mixer is used in this position.

The circuitry used is entirely conventional except that the value of the resistor feeding pin 5 has been reduced from the usual value of 10k to 3k3. The resulting increase of current through the device, improves signal handling capabilities, especially with regard to intermodulation performance.

The tuned output circuit uses a trifilar winding on an Amidon T68/2 powdered iron toroid. Do not substitute any other specification toroid in this position, although the wire used can vary a gauge or so either side of specification, without any problems. The impedance at the output (secondary of T1) is close to 200 ohms.

COMMISSIONING PROCEEDS AS FOLLOWS

Temporarily connect a 220 ohm resistor across the output. Put a shorting link across the audio input.

Apply power to both the BFO and balanced modulator. Using the diode probe, measure the voltage at pin 8. It should be around 0.15 volts. If not, adjust the size of the resistor in series with pin 8, until the required reading is obtained.

Turn the 50k ten-turn balance trimpot until it is at one end of its range. Using the probe, measure the voltage across the temporary 220 ohm output load. Adjust the 130 pF trimmer for the maximum reading. The actual value of this reading is unimportant.

One turn at a time, take the 50k balance potentiometer to the other end of its travel, noting the output reading at each setting. The output indication should drop from its initial value to zero and then rise again to its initial value. Readjust the trimpot, so that it is midway between the two settings, where the output voltage reading JUST reached zero. The modulator is now roughly balanced. Final balancing will be done, when a higher level transmit signal is available from later modules.

C — THE MICROPHONE AMPLIFIER

A low noise op-amp, the Signetics NE5534, provides the small amount of gain necessary to drive the balanced modulator. Substitution of other types is not recommended.

The input network suits most low (500-2000 ohm) impedance microphones. Whilst ideally a second low pass filter should be used to ensure a controlled cut off above 3000 Hz, it has been omitted deliberately. Instead, the 1n0 capacitor between pins 2 and 6 of the NE5534 provides a less steep cut off above 3000 Hz. Individual constructors may care to provide their own switching to bring the receiving low pass filter into play, in the transmit mode.

Note that the 22k resistor into pin 2 of the op-amp is mounted vertically. The RF suppressing ferrite bead, shown on the circuit diagram is slipped over one of the leads of this resistor, before it is soldered into place.

SUPPLIERS

All of the components used were obtained from Stewart Electronic Components Pty Ltd, 44 Stafford Street, Huntingdale, Vic. 3166. Telephone (03) 543 3733.

However, other suppliers are known to handle specific items. For example, Ian J Truscott's Electronic World, in Victoria, and RJ and US Imports, in New South Wales, both of whom advertise in this magazine, are known to stock Amidon products. Daneva Australia of 66 Bay Road, Sandringham, Vic. 3191. Telephone: (03) 598 5622, are known stockists of the SBL1 double balanced mixers.

It is understood, that the Frankston and Mornington Peninsula Amateur Radio Club, PO Box 38, Frankston, Vic. 3199, will be making PCBs and kits available for this project, as a service to constructors who find shopping around for the correct items a little difficult.

The writer will be happy to answer technical questions (SASE please), but prefers not to become involved in supply problems.

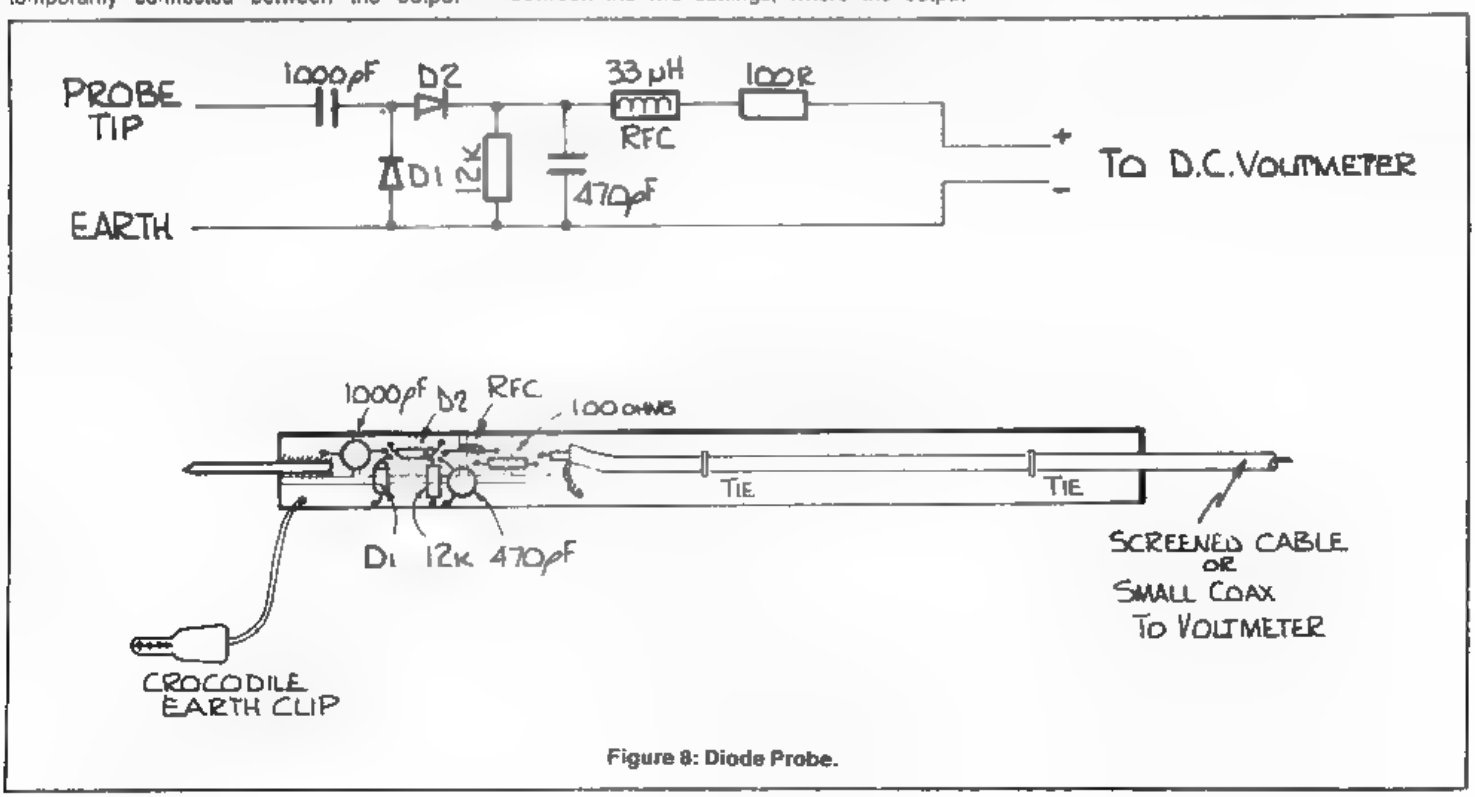


Figure 8: Diode Probe.

AN APPROACH TO ANTENNA TUNING

Lloyd Butler VK5BR
18 Ottawa Avenue, Panorama, SA 5041

Some ideas are presented on how to match the transmitter to the complex impedance of the antenna circuit and an examination is made of the tuning range needed for matching components.

As a preliminary exercise to designing a new tuner, the writer set out to find out what tuning components would be needed and how they might best be connected. What follows is essentially a paper exercise making use of a computer program to simulate a wide range of tuning conditions. From the results, some interesting curves have evolved leading to a few ideas on tuner application.

The function of the antenna tuner is to transform the complex impedance presented by the antenna, or its feeder system, to a resistive value suitable to load the transmitter. This resistive value (R_s) is normally 50 ohms and throughout the discussion which follows, this value is assumed.

The spread of resistive and reactive components which must be matched depends on the type of antenna system used. Where antennas are carefully matched to transmission lines, the spread is limited, but where feeder lines are tuned, or compromise antenna systems are used, a wide range of values has to be accommodated.

Precisely what range of values should be designed for, is difficult to decide, but the writer initially decided to aim for the following specification:

Frequency Range — bands 1.8-28 MHz inclusive.
Resistance Range — 1 to 1000 ohms.
Reactance Range — -1000 to +1000 ohms.
Peak Power Rating — 400 watts PEP.

This turned out to be quite a tall order, not because of any theoretical problem, but because on the low frequency bands particularly large values of variable inductance and capacitance are required.

A MATCHING PRINCIPLE

The first approach was to make use of a principle described by the writer in *Amateur Radio*, December 1985. Referring to Figure 1, a network is made up in two sections, an antenna phasing section which cancels any antenna reactive component and an impedance matching section which transforms the remaining resistive component to a value equal to R_s (50 ohms)

The impedance matching section is illustrated in Figures 2 and 3. Where the load resistance R_A is less than the source resistance R_s, the circuit and formula of Figure 2 is used. In this case, capacitive reactance X_{C1} is at the input. Where R_A is greater than R_s, the circuit and formula of Figure 3 is used. In this second case, capacitive reactance X_{C1} is at the output.

The antenna phasing section can simply be a series reactance equal, but opposite in sign, to the antenna reactance (X_A), that is, a capacitor to balance inductive reactance, or an inductor to balance capacitive reactance.

Using the principles described, the tuner as shown in Figure 4 is evolved.

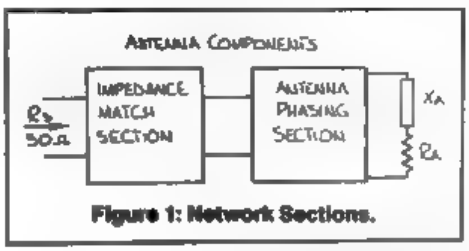


Figure 1: Network Sections.

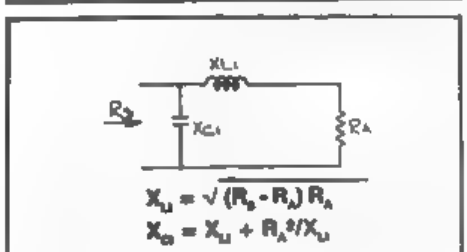


Figure 2: Impedance Match RA < RS.

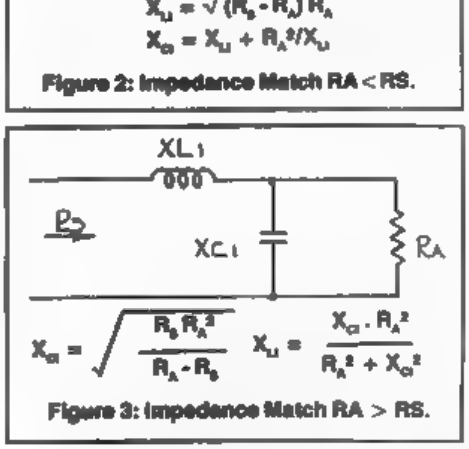


Figure 3: Impedance Match RA > RS.

COMPONENT VALUES

The writer set out to determine the range of values of C1, C2, L1 and L2 in the circuit (Figure 4) over the frequency and impedance ranges previously discussed. As many permutations were required, a computer program was set up to produce tables of results which were used to prepare the curves Figures 5-7. Figure 5 shows the capacitance of C1 plotted as a function of R_A for each of the principal amateur radio HF bands. The figure illustrates the very large capacitance required for low values of R_A, particularly on the low frequency bands. Figure 6 shows the inductance of L1 plotted as a function of R_A for each of the bands.

The value of phasing capacitance C2, or phasing inductance L2, can be read off as a function of X_A for each band from Figure 7. The very large value of C2 is also illustrated for low values of antenna inductive reactance (X_A).

PARALLEL ANTENNA PHASE CORRECTION

The antenna impedance, in the form of a resistive and reactive component in series, can be transformed to two other components of resistance and reactance in parallel, as shown in Figure 8 using the formula included with the diagram.

As an alternative to phase correction by series tuning, as shown in Figure 4, the reactive component can be cancelled out by a parallel reactance equal but opposite in sign to the equivalent parallel reactance. This method of phase correction has a number of attractive features as follows.

1. The equivalent shunt reactance is much higher than the series value (X_A) and if the antenna is inductive, a smaller value of phasing capacitor is needed to tune it out.

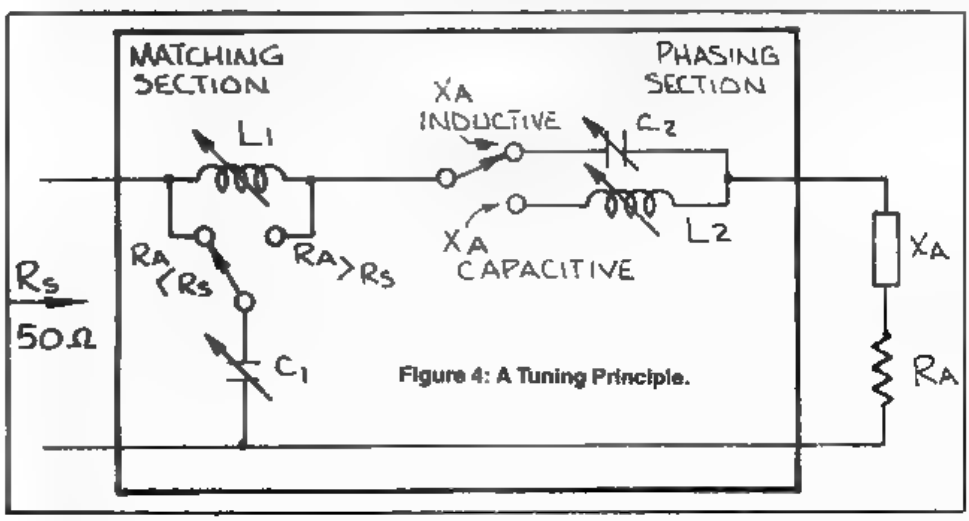


Figure 4: A Tuning Principle.

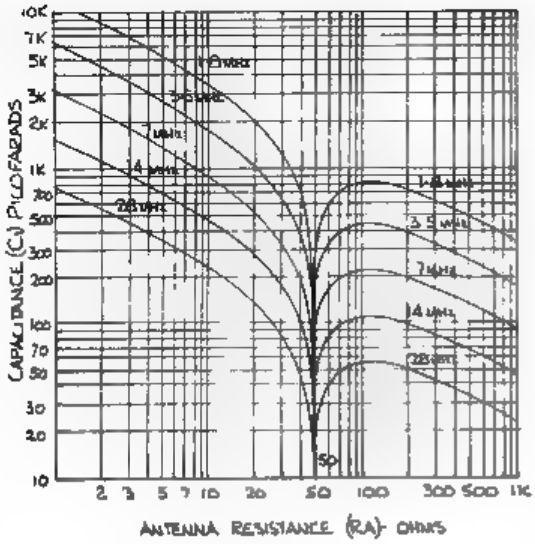


Figure 5: Matching Capacitance as a Function of Antenna R

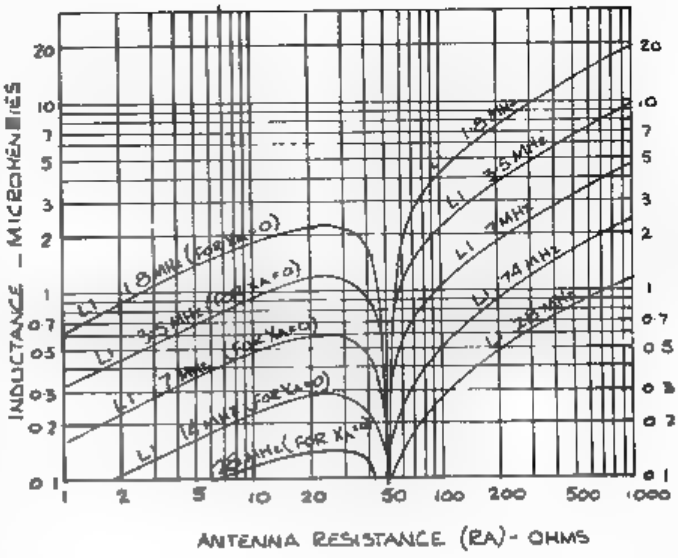


Figure 6: Matching Inductance as a Function of Antenna Resistance.

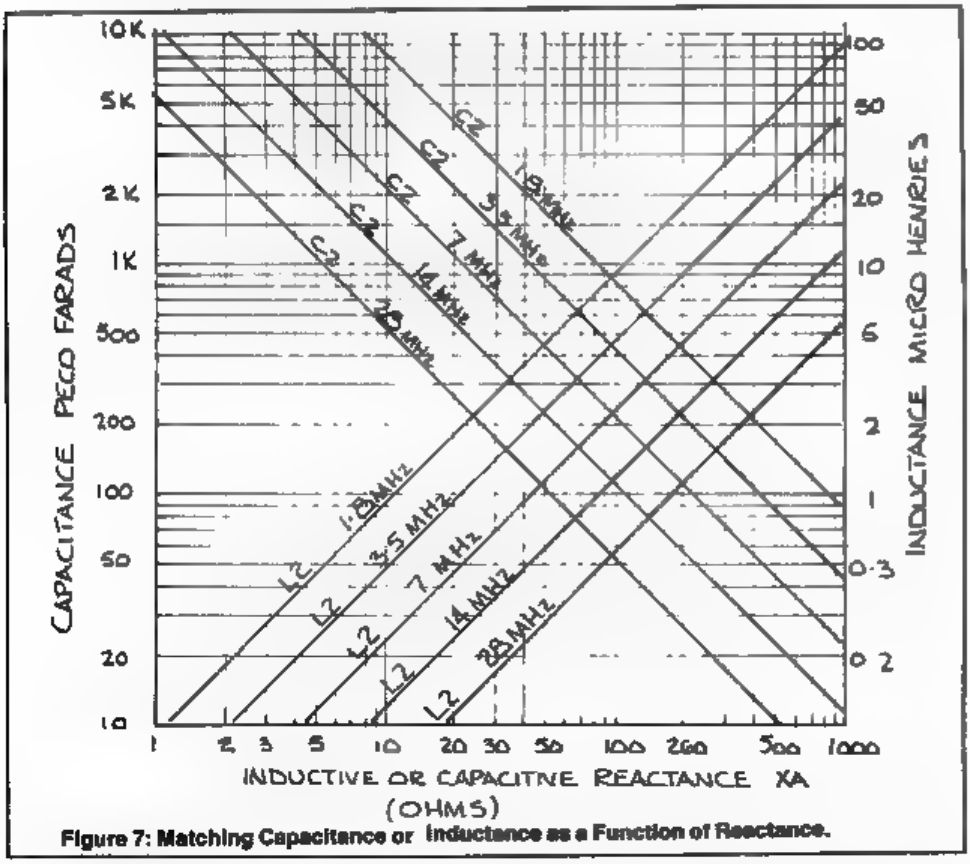


Figure 7: Matching Capacitance or Inductance as a Function of Reactance.

(It does mean, however, that a larger value of inductance is needed to tune out the reactance of a capacitive antenna)

2If the tuner is to couple to a balanced circuit, series components must be balanced in each line leg and the number of series components is doubled. With parallel tuning, a duplication of components is not required.

3Referring back to Figure 5, we see that the capacitance required in the matching circuit decreases as the antenna load resistance (R_A) is increased. The effect of parallel tuning is to present a new value of load resistance (R_A') higher than the value of R_A and hence the size of the capacitor in the matching section can be reduced.

On the negative side, the increased antenna circuit impedance does increase the voltage developed for a given power and hence the voltage across the parallel tuning capacitor.

Figure 9 plots the equivalent parallel resistance (R_A') as a function of series resistance (R_A) for different values of series reactance (X_A). Figure 10 plots the equivalent parallel reactance (X_A') as a function of series reactance (X_A) for different values of series resistance (R_A). Figures 9 and 10 are a graphical representation of the formulae shown in Figure 8.

Figure 11 illustrates the application of parallel phase correction. Capacitor C2 combines the function of matching capacitor for $R_A' > R_0$ with the function of phase correction for an inductive antenna. Capacitor C1 provides matching for $R_A' < R_0$ and is set to minimum for $R_A' > R_0$.

Another idea is to use parallel phase correction for an inductive antenna together with series phase correction for a capacitive antenna, as shown in Figure 12. This gives a lower value of phasing inductance (L2) for the capacitive antenna as well as a lower value of phasing capacitance for the inductive antenna.

The curves of Figures 5 and 6 can be used to calculate the matching sections components using parallel antenna phasing with the series antenna resistance (R_A) substituted by equivalent shunt resistance (R_A').

PRACTICAL VARIABLE INDUCTORS AND CAPACITORS

At this point, an examination of practical values of the components will be made. It is one thing to calculate a range of tuning inductance and capacitance but another thing to obtain the components to do the job.

As far as the inductors are concerned, it is not too much trouble to construct 25 to 30 microhenries of inductance suitable for fitting with switchable taps. A value discussed later is 28 microhenries and this can be achieved with 35 turns, one inch radius and spaced to a length of three and a half inches. Inductance can be calculated using Wheeler's formula which follows:

$$L \text{ (microhenries)} = \frac{a^2N^2}{9a + 10l}$$

where a = radius in inches
N = number of turns
l = length in inches.

This becomes.

$$L = \frac{a^2N^2}{2.54\,(9a + 10l)}$$

for dimensions in centimetres.

Reference to Figure 6 shows that 28 microhenries is more than sufficient for the matching circuit. Reference to Figure 7 shows that 28 microhenries can phase correct a capacitive antenna of X_A = -300 ohms at 1.8 MHz and X_A = -600 ohms at 3.5 MHz.

Considering now the tuning capacitance, its maximum value is considerably restricted by the maximum voltage applied across its plates and hence the necessary spacing of the plates. The larger the plate spacing required, the more difficult it is to achieve a high value of capacitance. Where a capacitor is connected across a resistive load, the voltage developed across its plates is proportionally to the square root of both the load resistance and the power, ie $E_{PEAK} = 1.4\sqrt{PR}$.

When tuned correctly, the capacitor facing the transmitter is across 50 ohms; however the capacitor across the antenna circuit could be facing a much higher resistance particularly if parallel antenna phasing is used. Typical voltages could be as follows:

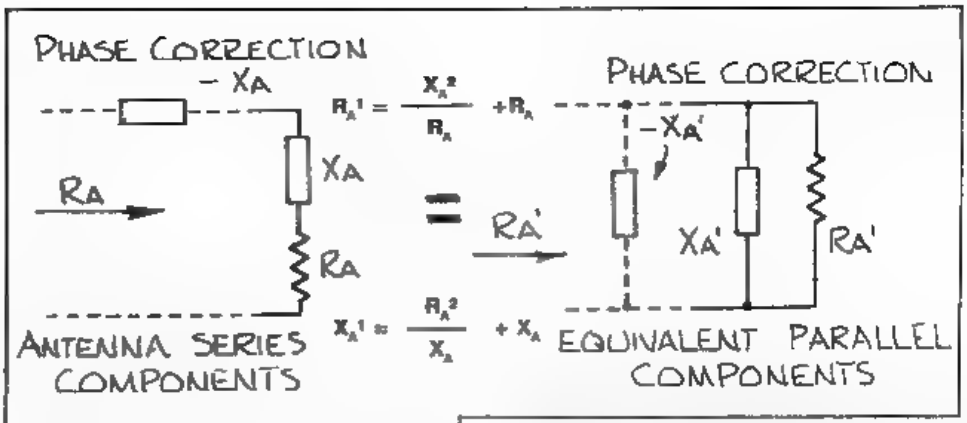


Figure 8: Parallel Equivalent of Antenna Circuit.

P = 100 W	R = 100 ohms	E_{PEAK} = 140 V
P = 100 W	R = 1000 ohms	E_{PEAK} = 442 V
P = 100 W	R = 5000 ohms	E_{PEAK} = 990 V
P = 400 W	R = 100 ohms	E_{PEAK} = 280 V
P = 400 W	R = 1000 ohms	E_{PEAK} = 885 V
P = 400 W	R = 5000 ohms	E_{PEAK} = 1980 V

According to *ITT Reference Data for Radio Engineers*, an approximate rule for uniform fields is that the breakdown gradient of air is 30 peak kilovolts per centimetre or 75 peak kilovolts per inch.

Large values of variable capacitance can be made up using old style receiver tuning gangs. (If you can get them, Ed). Each section of these usually has a maximum capacitance of about 450 pF making a total capacitance of 990 pF for two gang sections, or 1350 pF for three gang sections. The plate a r spacing on these seems to average around 0.01 inch, which on the ITT approx mation, has a breakdown vo t-age of 750. Referring to the curve of Figure 13 (also from the ITT handbook) a slightly higher voltage is indicated providing there are no sharp points to concentrate the field. (possibly 1000 V). Based on this assumption the receiver type gang could be satisfactory for a 100 W transmitter but could arc over when using higher power (say 400 W from a linear amplifier) Operation in the writer's own radio shack has verified this prediction.

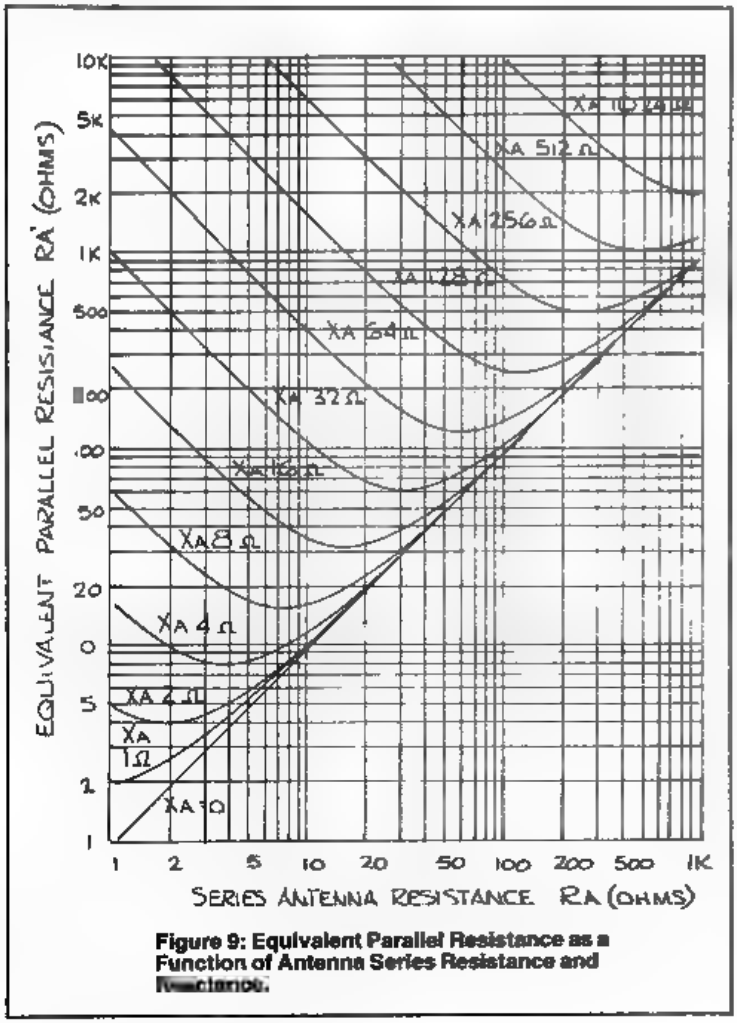


Figure 9: Equivalent Parallel Resistance as a Function of Antenna Series Resistance and Reactance.

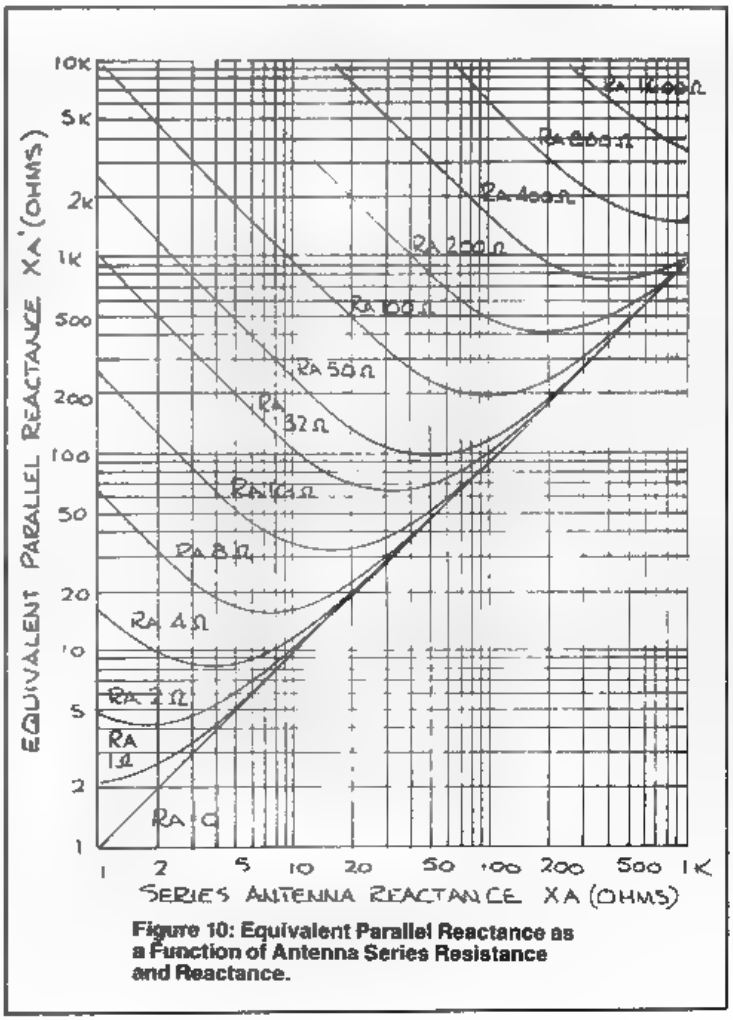
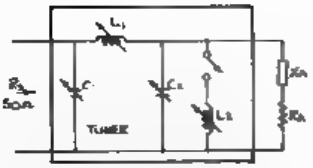
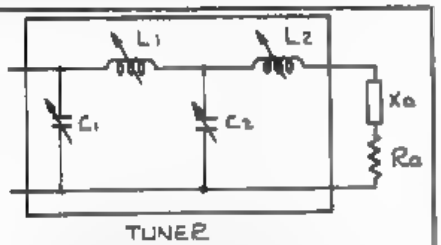


Figure 10: Equivalent Parallel Reactance as a Function of Antenna Series Resistance and Reactance.



C1 Matches for $R_A' < R_s$
C2 Matches for $R_A' > R_s$ and also balances out X_A' for inductive
L1 is the matching inductance.
L2 Balances out X_A' for capacitive

Figure 11. Use of Parallel Antenna Phase Correction.



C1 Matches for R_A (or R_A') $< R_s$
C2 Matches for R_A (or R_A') $> R_s$ and also balances out X_A' for inductive antenna.
L1 is the matching inductance.
L2 Balances out X_A for capacitive antenna.

Figure 12: Use of Combined Parallel and Series Antenna Phase Correction.

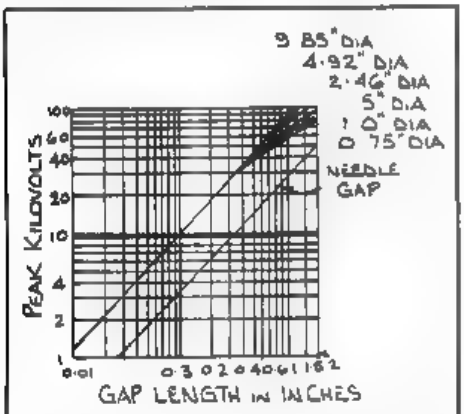


Figure 13: Spark Gap Breakdown Voltages.

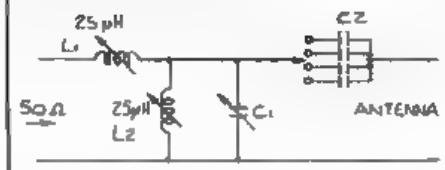
Tuning capacitor plate spacing of at least 0.02 inch would seem necessary to operate 400 W PEP, and for this spacing, suitable capacitors above 200 to 240 pF are difficult to find. A tuner design aimed at reducing the range of capacitance tuning would clearly be an advantage

REDUCTION OF MATCHING CAPACITANCE

Referring back to Figures 2 and 5, the largest values of matching capacitance are required when R_A is less than R_s, with the capacitance connected at the input of the network. If R_A could be artificially increased above R_s, for all antenna impedance conditions, the need for the input capacitor would be eliminated. Use of parallel antenna phasing results in an increased value of antenna load resistance (R_A'), but for low values of X_A, R_A' is still lower than R_s.

Examining Figure 9, it can be seen that R_A' can be kept higher than R_s by ensuring that X_A is always higher than 30 ohms (or less than minus 30 ohms). This can be achieved by adding lumped reactance to the antenna circuit with an inductor or capacitor.

One circuit simulated on the computer used series capacitance switched by incremented steps into the antenna circuit. For each antenna impedance condition, a capacitance was selected which made the antenna circuit look at least 30 ohms capacitive. For an inductive antenna, the added capacitive reactance was made equal to the inductive reactance plus approximately 30 ohms.

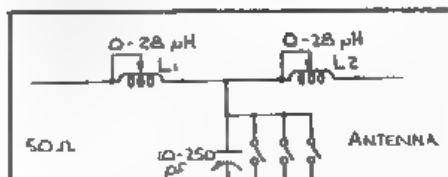


	C1
1.8 MHz	280 - 9[illegible]
3.5 MHz	80 - 450
7.0 MHz	25 - 225
14.0 MHz	13 - 115
28.0 MHz	11 - 57

	C2 Fixed Capacitance Values Incremented Each Step 1.4:1 Range —
1.8 MHz	47 - 4700 pF
3.5 MHz	39 - 2200 pF
7.0 MHz	20 - 1500 pF
14.0 MHz	10 - 1200 pF
28.0 MHz	10 - 820 pF

Figure 14: A Circuit with Parallel Antenna Phase Correction and Added Series Capacitance (see text).

The elements of the circuit are shown in Figure 14. Component bank, C2, is the added series capacitance selected to eliminate the matching circuit input capacitor. Parallel inductance (L2) resonates with the effective antenna shunt capacitance up to the point where the inductance limit of 25 microhenries is reached. C_2 has a wide capacitive range but need not be continuous in its coverage, that is, switched fixed capacitors substitute for a prohibitively large variable tuning unit. Switched capacitors, incremented in a ratio of 1.4 to 1, have been found to be satisfactory. Trimming between switched steps is corrected by adjustment of matching capacitor C1. This capacitor also adds extra capacitance to resonate with L2 when L2 has reached its limit of 25 microhenries.



	C1
1.8 MHz	300 - 2000 pF
3.5 MHz	150 - 750 pF
7.0 MHz	40 - 300 pF
14.0 MHz	20 - 120 pF
28.0 MHz	10 - 50 pF

Figure 15: A Circuit with Parallel Antenna Phase Correction and Added Series Inductance. Only One Variable Capacitor is Required. (see text).

A further circuit is shown in Figure 15, in which the antenna section is made to have at least 30 ohms of inductive reactance, by simply increasing the value of series phasing reactance (L2) until this condition is satisfied. The circuit is, in fact, a development of the principle discussed relative to Figure 12, but with the antenna tuning constants altered to achieve elimination of the input matching capacitor. Only one variable capacitor (C1) is required which combines the function of impedance matching capacitance with that of a capacitance to equalise the shunt reactance reflected across it from the antenna circuit.

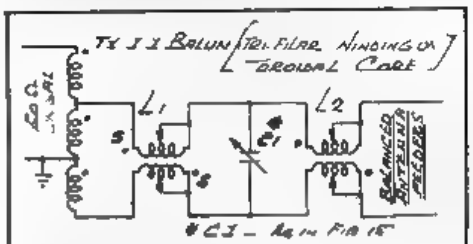


Figure 16: Balanced Tuner Using Mutually Coupled Inductance Between Each Leg of the Balanced Circuit.

Table 1 shows the range of antenna impedances which can be matched and the variation of L and C components needed for each of the main amateur bands. The table is based on a maximum component inductance of 28 microhenries and an effective antenna inductive reactance set at a minimum of 65 ohms at 1.8 MHz. This value of reactance has a considerable effect on the value of all three tuning components and 65 ohms (increasing a little as frequency is raised) works out to give a better compromise for all component values than the 30 ohms originally nominated.

Table 1 is, of course, a theoretical conclusion based on simulated conditions using perfect inductors and capacitors. No allowance is made for the effect of loss resistance in the components themselves (For example, an antenna resistive load of 2 ohms might be considerably increased by the loss resistance of the tuning inductor in series with the antenna).

The range of reactance is not quite as great as that aimed at in the original specification, but as indicated earlier, that specification was a little over ambitious.

To tune up to 1.8 MHz, C1 needs a tuning range to 2000 pF. In the diagram a variable capacitor with a maximum value of 250 pF has been assumed and three fixed capacitors have been included which can be switched in various combinations to extend the range to 2000 pF.

BALANCED TUNING

If the tuner is to feed balanced lines, a balanced tuner is required. Series components should be split so that half of each component reactance is placed in each balanced line leg. If tapped (and switched) variable inductors are used (as distinct from roller inductors) mutually coupling the inductor halves in each leg, seems an attractive idea, as shown in Figure 16. In this arrangement, the same combined inductance with the same number of combined turns, is achieved as with the single inductance in the unbalanced circuit. The idea is to cut the coil at its centre and connect one half in each line leg, making sure that the sense of connection gives additive and not subtractive combined inductance (refer to Figure 17).

A balun transformer is required to interface the unbalanced transmitter output circuit to the balanced circuit. The primary reactance of the balun should be at least four times the circuit impedance at the lowest operating frequency,

FREQUENCY (MHz)	RANGE OF ANTENNA RESISTANCE R_A (OHMS)	RANGE OF ANTENNA REACTANCE X_A (OHMS)	RANGE OF SERIES INDUCTANCE L1 (MICROHENRIES)	RANGE OF SERIES INDUCTANCE L2 (MICROHENRIES)	RANGE OF SHUNT CAPACITANCE C1 (PICOFARADS)
1.8	2 to 6	-250 to 60	20 to 28	0 to 28	1600 to 1700
	6 to 20	-250 to 130	14 to 28		1000 to 2000
	20 to 70	-250 to 250	6 to 28		700 to 1700
	70 to 300	-250 to 500	6 to 28		500 to 1250
	300 to 1000	-250 to 1000	12 to 28		300 to 600
3.5	1 to 5	-500 to 128	14 to 28	0 to 27	510 to 650
	5 to 20	-500 to 250	10 to 28		250 to 750
	20 to 150	-500 to 500	4 to 23		200 to 770
	150 to 1000	-500 to 1000	4 to 23		150 to 300
7.0	1 to 3	-1000 to 150	14 to 21	0 to 27	200 to 213
	3 to 5	-1000 to 300	10 to 21		100 to 230
	5 to 20	-1000 to 500	5 to 28		70 to 250
	20 to 1000	-1000 to 1000	2.5 to 17		40 to 300
14.0	1 to 8	-1000 to 500	10 to 20	0 to 13	30 to 90
	8 to 1000	-1000 to 1000	1.5 to 15		20 to 120
28	1 to 5	-1000 to 500	7 to 14	0 to 7	10 to 50
	5 to 1000	-1000 to 1000	1 to 10		10 to 50

Table 1: Range of Antenna Impedances Tunable and Range of Inductance and Capacitance Required for Circuit of Figure 15.

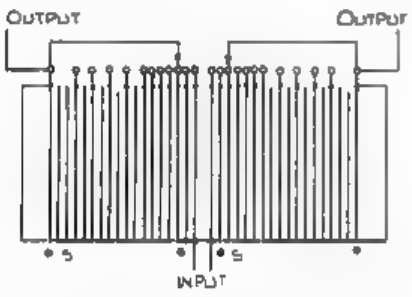


Figure 17: Winding of Balanced Inductor.

that is, four times 50 ohms or 200 ohms. At 1.8 MHz, this means a minimum inductance of 17.6 microhenries. A shunt reactance of 200 ohms across the 50 ohm circuit reflects an equivalent series reactance of about 17 ohms (ie one microhenry) to the matching circuit. This will affect the matching circuit but only to a minor degree.

The wideband balun transformer is easily constructed, using a tri-filar winding on a suitable toroidal core, selected for the frequency range and with sufficient core cross section area to prevent core saturation.

The minimum number of tri-filar turns is calculated as follows.

$$\text{Turns (T)} = 25\sqrt{L/A_L}$$

where L = minimum primary inductance in microhenries
A_L = number of turns per 100 microhenries from manufacturers specifications.

The operating flux density (B_{OP}) is calculated as follows.

$$B_{OP} = \frac{E_{RMS} \times 10^8}{4.44\, fNA_c} \text{ GAUSS}$$

where $\sqrt{PR}$ = 140V (for 400W in 50 ohms)
E_{RMS} =
f = frequency (Hz)
N = number of turns
A_c = cross-section area of core in square cm.

The flux density should be much lower than the saturation value (about 10 000 gauss for iron powder cores).

A suitable toroid for the high power case is the Amidon T200 (2 Mix Red). Its cross-section area is 1.33 square centimetres and it has an A_L factor of 120 turns per 100 microhenries. Twelve tri-filar turns on this core is satisfactory for 1.8 MHz.

One might question why the balun could not be placed at the output of the tuning system allowing the whole system to be unbalanced. The problem here is that the transformer would not only have to be designed for a wide range of frequencies, but it would also have to be made to operate over the wide range of output impedances, a somewhat difficult proposition.

FIXED CAPACITORS

Some care must be taken in selecting fixed capacitors. If high impedance feed systems with high powers are anticipated, voltage ratings in the order of 1500 to 2000 volts should be considered. In high power RF work, voltage is not the only consideration as capacitors made for this purpose are also given a maximum current rating. At low frequencies, voltage is the limiting factor, but the reactance of a capacitor decreases with frequency and hence for a given voltage, current through the capacitor increases with frequency to a point where current is the limiting factor. At the highest operating frequency, the current, calculated by dividing the maximum expected voltage by the reactance, should not exceed the capacitor current rating.

Another factor, particularly relevant to ceramic capacitors, is the need to reduce voltage and current ratings when temperature rises to any extent, due to internal heating of the capacitor. Ceramic capacitors generally have considerable loss resistance which can produce heating of the dielectric when high RF currents are passed through the capacitor.

The best bet for amateurs is to acquire high voltage mica capacitors from discarded radio transmitters.

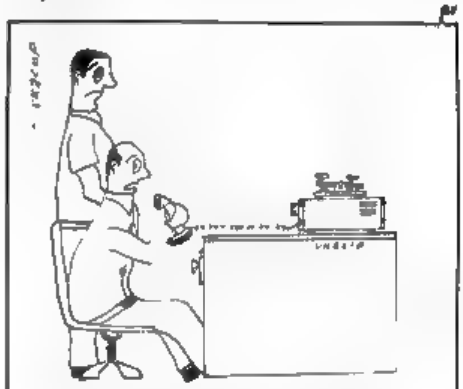
CONCLUSION

The curves included give a lead to the order of components needed to match the transmitter to a wide range of antenna impedance loads. On the low frequency bands, the range of tunable capacitance needed becomes a problem. This range can be reduced by parallel phase correction of the antenna circuit rather than series phase correction.

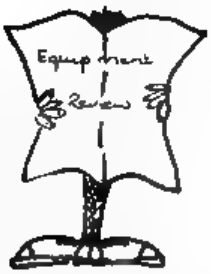
The circuit, Figure 15, makes use of part series and part parallel phase correction. By enforcing a condition of inductive reactance in the antenna circuit, a single tunable capacitor element of fairly large (but not intolerable) range is achieved. The circuit of Figure 15 (and perhaps the balanced version in Figure 16) appears to be an attractive proposition for a wide range tuner. Of course, the proof of the pudding is in the eating and it must be emphasised that practical application of the idea has yet to be tried.

A few pointers have been thrown in with the discussion concerning the selection of suitable components. Availability of these is another real problem.

There are all sorts of ways of matching a transmitter to an antenna. What is written here should give some food for thought on this subject.



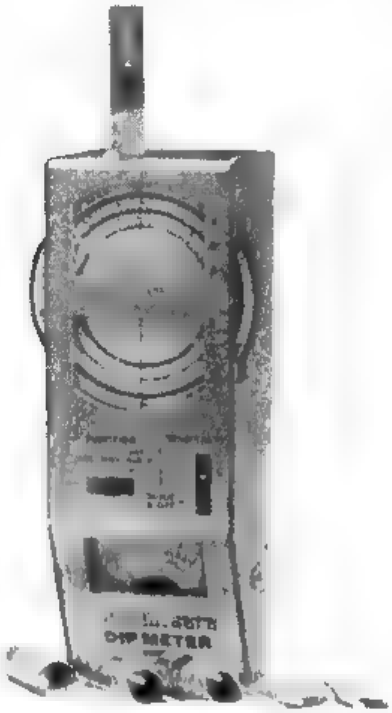
"*Someone* come in please. I have a friend in the shack!" —VK2COP



Equipment Review

Gil Sones VK3AUI
30 Moore Street, Box Hill South. Vic 3128

MAPLIN DIPMETER



Photographs courtesy Belfern Productions

The Dipmeter is one of the basic items of amateur test equipment. Once it was called a Grid Dip Oscillator but that name can no longer be used. The basic instrument relies on the detection of energy absorption by another coupled tuned circuit when both it and the oscillator are on the same frequency.

The detection circuitry can be used as an absorption wavemeter, if the oscillator is disabled. Very useful to find the oscillator frequency and to check the output frequency of a transmitter. The frequency of parasitic oscillations may also be determined. The last use is often of great importance in designing measures to deal with parasitic oscillations.

Close-up view of the Meter Movement.

The Maplin Dipmeter performs well. It is neat and easy to use. There are no false dips on any but the highest VHF range. The false dip on the highest VHF range does not mask a real dip.

The dips on all ranges are deep and definite. No need to be afraid of blinking at the wrong time.

The frequency accuracy is good. However, as with all similar instruments there is some influence from the surrounds of the item being checked. The need to couple to other circuits for operation limits the accuracy of all such instruments.

The highest frequency coils are of printed circuit board construction, all coils being covered in shrunk plastic for protection from damage due to handling.

The instrument uses a nine volt transistor radio battery, which is provided. Access to the battery is by splitting the case. A screwdriver is required for battery changing.

A convenient attribute is that the oscillator can be modulated, which aids in finding the signal on a receiver. Checking the frequency with a receiver is one way of removing any doubt as to the calibration.

The 'dipper' may be used for its primary purpose of checking the resonant frequency of tuned circuits. To use it primarily for this purpose is to seriously under use the instrument.

Using known standards of inductance and capacitance, both capacitors and inductances may be checked for their value. With just a few high quality known capacitors the unknown value of an inductor can be determined or conversely with a known inductance the value of a capacitor can be readily determined.

Internal view when the Back Cover is removed to fit the provided Battery.

Controls of the Unit.

Aerials and feedlines are another area where the instrument may be put to good use. The resonance of lengths of feedline can be found, velocity factors calculated and aerials may be checked for resonance. The whole of an antenna system, including the feedline can be checked for wanted and unwanted resonances.

The dipmeter is a very versatile tool. The Maplin Dipmeter that was reviewed was well constructed, easy to use and is a fine example of its type of instrument. A useful 'shack' accessory.

The review instrument was supplied by William Willis & Co Pty Ltd, 98 Canterbury Road, Canterbury, Vic 3126 who are the Australian Agents.

ar

HOUSES WITH BUGS

In Los Angeles, some houses with bugs are selling faster.

These bugs are of the electronic variety, legal cousins of the species we associate with spies and detectives. Tune them in on your car radio and you can hear a prerecorded message about the house for sale.

Outside the house, a "For Sale" sign tells you which frequency to tune in. Inside the house, a small cabinet houses a cassette player, a microphone and the transmitter.

The device sells for about US$200 and is seen as a natural for other businesses too. A theatre might broadcast its current features and show times; a supermarket can announce its current specials, a shopping mall could promote its tenants... the range is endless.

Hundreds of LA-area home owners have bought a device. Next thing you know, someone will find a way to add programs to these commercials! ! !

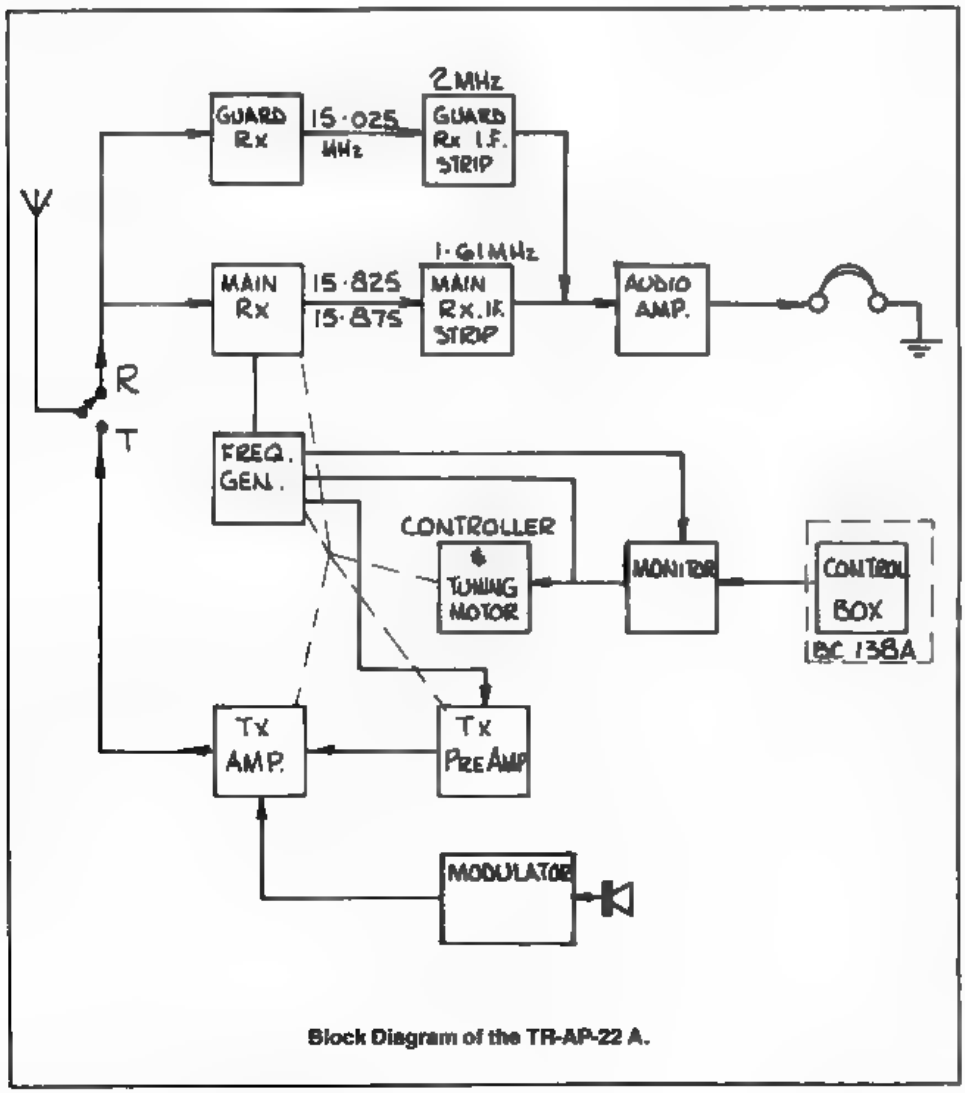
Adapted from Gernsback's Outlook, February 1987

CLASSIC COMMUNICATIONS EQUIPMENT

The TR-AP-22 A TRANSCEIVER

Colin MacKinnon VK2DYM
52 Mills Road, Glenhaven, NSW. 2154

Last month the TR-AP-21 A was described. The TR-AP-22 A is a high power companion unit. It comes from the same manufacturer, "Omera- Segid," and was also fitted to the RAAF Mirage III fighters.



Block Diagram of the TR-AP-22 A.

The TR-AP-22 A covers the same UHF military frequency range from 225 to 400 MHz. with an output of 15 watts maximum. It was designed around the same time, 1960, but unlike the smaller unit, it contains its own power supply dynamotor.

The components are the transceiver itself, the ER-68 A, and a control box, BC-138 A.

Technical specifications are:

Frequency Range	225 to 399.95 MHz
Channel Spacing	50 kHz minimum (RAAF — 100 kHz)
Stability	±20 PPM (about 6 kHz)
Preset Channels	20 — using the BC-138 A controller
Power Required	28 volts DC at 13 to 23 amps
Power Output	10 to 15 watts (depending on frequency)
Modulation	Amplitude modulation and MCW
Weights	ER-68 A. . 24.1 kg BC-138 A 1.7 kg
Limitations	same as the TR-AP-21 A

This transceiver also contains a second receiver unit on a fixed frequency, called a "guard channel," that is used for emergency or group command communication. It is also possible to use the set as a relay station for other aircraft, to achieve greater ranges. An automatic direction finding facility was not used in the RAAF Mirages.

The range is basically line-of-sight and obviously dependent on aircraft altitude.

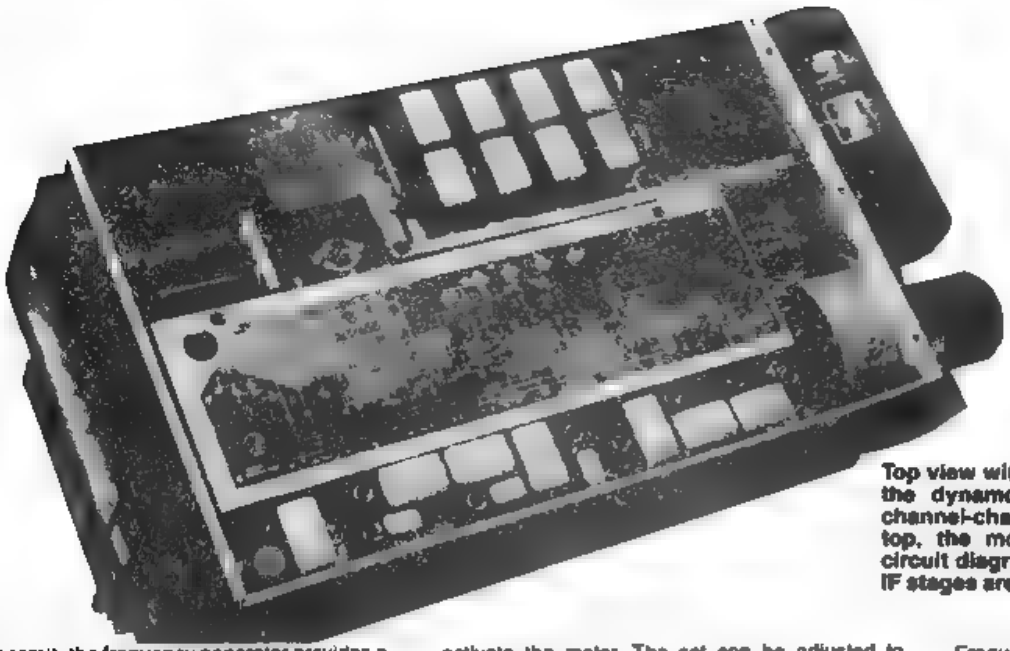
As with most aircraft equipment, the construction is of aluminium, with a number of modules plugged onto a main chassis. Each module can be tested in situ, and can be replaced quickly if required. There are test sockets and controls on the front panel to assist operational checking. The dynamotor and a fan are mounted at the top rear of the unit. The main connection to the aircraft harness is on the rear and made as the set is slid into its shock mount.

This unit contains a total of 75 sub-miniature and miniature valves (75 is correct!). You will note from the photographs that the circuit diagram of each module is printed on an attached plaque, and is handy if your read French.

It will help to refer to the previous description of the ER-68 A and the block diagram below to follow the circuit description.

On reception, the signal passes from a conventional T/R relay to an RF amplifier thence to the first mixer. The other mixing frequency is supplied from a complex frequency generator to be described later. Following an IF amplifier stage at 18.825 or 18.875 MHz, the signal is mixed with one of two crystal oscillators to give a second IF frequency of 1.61 MHz. The signal is then detected and goes through a noise limiter and squelch circuit to an audio amplifier. AGC from the detector stage is applied to the RF, IF and audio stages.

The guard receiver is an almost identical setup in parallel, but has its own oscillator for it's first mixer, and only needs one crystal at the second mixer oscillator. The audio output from the guard receiver feeds to the common AF amplifier.



Top view with cover removed. At top rear is the dynamotor with the fan below. The channel-change Ledex switches are at the top, the monitor in the centre (note the circuit diagram on the cover), main receiver IF stages are at the bottom.

On transmit, the frequency generator provides a signal which is amplified and tripled to the output required, and the audio signal from a microphone amplifier and clipper circuit modulates the final two RF stages. A side-tone circuit picks off a little RF and provides a signal to the AF amplifier for checking the CW transmissions.

The frequency generator for both transmit and receive is a complex combination of additive mixers, doublers and triplers to achieve 3500 channels from 25 crystals. The development of IC phase lock loops and digital dividers must have been a god-send to later designers! Omera actually calls the frequency generator a "monitor" as it provides feedback signals to the tuning mechanism to lock onto frequency. A detailed description of the frequency generation process would take a page or two, so I will just say, "Trust me, it works!"

The monitoring provides switching for the tuning motor, brake and reversing mechanism so that the tuning gang rotates and comes to rest in tune, for each frequency selected.

At one stage, before I fully understood the functioning, I couldn't work out why the motor would suddenly come to life and whiz the tuning gang back and forth for no good reason, sometimes for 30 seconds. I found it was caused by the circuit sensing an out of phase condition which is only slightly off, but just enough to activate the motor. The set can be adjusted to minimise the effect.

The control box BC-138 A has a 20 channel preset dial but also has five other dials to select any channel within the tuning limits, eg dial one, on the left, selects 200 or 300 MHz, dial two selects 0 to 99 MHz (it is only marked 0-9), dial three selects 0 to 9 MHz, etc. The controller also adjusts volume and selects the operation of main and guard receivers.

The dynamotor, DY-21 A, is attached to the transceiver and provides 120 volts and 320 volts, which is dropped to 125 volts regulated in the body of the ER-68 A. There is also a mechanical regulator to provide a regulated 20 volts as [redacted].

Both the TR-AP-21 and TR-AP-22 illustrate the tremendous design difficulties of providing multi-channel coverage in a sophisticated, critical environment. Just think of the possible spurious signals that all those oscillators and multipliers could generate! The quest for reliability is demonstrated by the high quality components and gold plated fittings used. Ease of maintenance is aided by plug-in modules and test sockets on each sub-assembly.

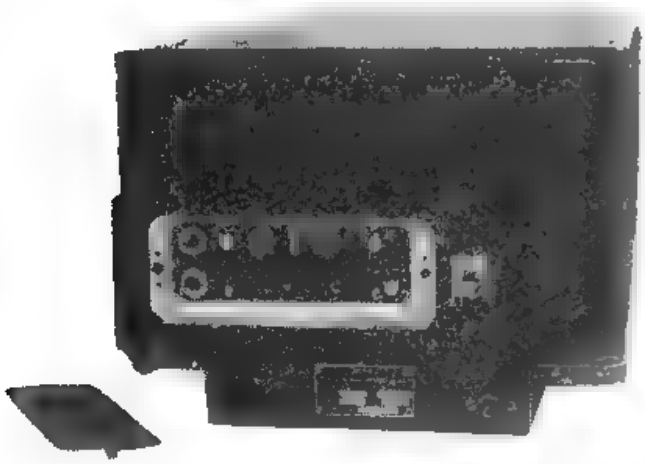
As a comparison, look at the following specifications of a recent Collins aircraft transceiver, the ANARC-182 (V) to see the progress that has been made:

Frequency Range	30 to 88 MHz FM 108 to 156 MHz AM 156 to 174 MHz FM 225 to 399 975 AM/FM
Channel Spacing	25 kHz
Stability	±1 PPM (about 300 Hz)
Preset Channels	20
Power Required	28 volts at about 1 5 amps
Power Output	10 watts AM, 15 watts FM
Weight	4.5 kg

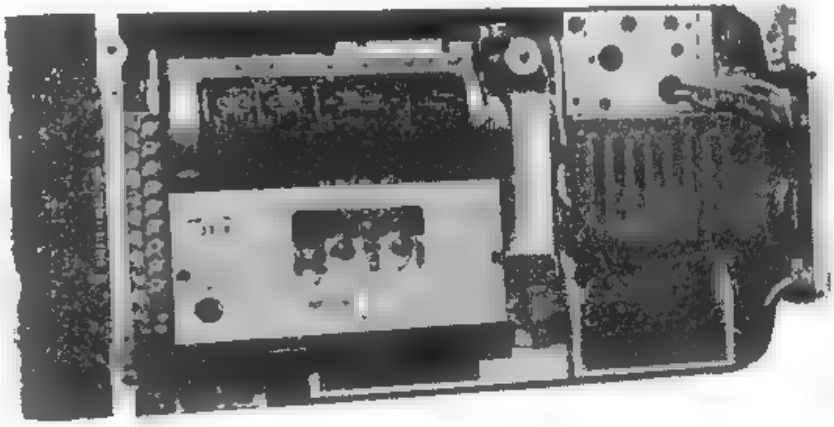
The whole transceiver fits into the space taken by the BC-138 A control box!

Now somebody is going to ask how to convert type TR-AP radios for the 70 cm amateur band. To be honest, it is not worth the effort. They are AM, draw up to 630 watts for 10-15 watts output and make a great racket when running. I did not mention earlier that the filament leads of the RF amplifiers are fed through copper tube tuning coils so you would have quite a job reducing the coils turns to tune up to 432 MHz.

Why not just clean up the set and put it on the coffee table as a conversation starter when guests call?



Front view of the TR-AP-22 A showing the air filter across the top preset controls and test points are behind the front cover. N-type antenna connector on the right end



Bottom view — RF stages with tuning capacitors are top-centre, tuning motor controller is lower left, guard receiver is top right and main connector plug is on the left

THE TIME

LE TEMPS

It affects our daily lives but the average person takes time for granted without a thought about its origins, development and many uses. This story covers GMT, UTC, and Zulu Time, Daylight Saving, History of Standard Time Zones and Accurate Time-keeping using Atomic Clocks and Satellites.

Jim Linton VK3PC
4 Ansett Crescent, Forest Hill, Vic. 3131

Anyone who has been a QSL manager, operated from a rare DX location, responsible for issuing a special event QSL card or award knows only too well that there is some ignorance about time

GET THE TIME RIGHT

With dozens, hundreds or thousands of incoming QSL cards it becomes a frustrating task to confirm from the log a QSL which does not have the correct UTC time and/or date

Instead of getting a QSL for a DX contact, the wrongly timed card is likely to be returned marked "Contact not in the Log."

All that fighting through a dog-pile, getting on a list, waiting in a net or other circumstance resulting in a DX contact could be a waste of time if you do not get the time and date right.

There has been considerable praise from overseas given to Australian Novices for their general operating standard, but one criticism has been incorrect times on their QSL cards. However to be fair, it is not only novices who have this failing

When organising activation of the Victorian 150 Commemorative Call Sign, VI3WI, it became clear some of the willing WIA members wanting to put the call on air lacked an understanding of how to use UTC.

Well, what is UTC? Firstly, we need to learn about Greenwich Mean Time (GMT)

GMT has been an ailing corpse for some years but it was only recently buried The Royal Observatory at Greenwich, near London, started keeping time in 1833, firstly for trading ships, but later, with help from the telegraph, Greenwich time signals were sent to train stations and cities in England and Europe.

In 1884, GMT became the world standard of time measurement and remained unchallenged during the next 40 years.

The GMT day before 1925 began at noon, and not midnight, because traditionally time had been based on the position of the sun at noon

The International Astronomical Union decided that the time/day should start at midnight, and the new midnight-based time at Greenwich was called Universal Time, or UT This then became Co-ordinated Universal Time — UTC is the abbreviation of the French words "Universel Temps Coordonne."

UTC, while based on the Zero Meridian (Greenwich) is kept by the International Time Bureau (Bureau Internationale de l'Heure), in Paris. Because UTC is based on the time at the Zero Meridian, that time standard is also referred to as Z, or phonetically Zulu-time

Now that we have established what it is, let us discuss how to calculate UTC for correct log book entries, times on QSL cards, tracking satellites or making scheds

Knowledge of the 24 hour time system of expressing time is needed — for those unfamiliar with this system the following table will explain:

1 am	0100	1 pm	1300
2 am	0200	2 pm	1400
3 am	0300	3 pm	1500
4 am	0400	4 pm	1600
5 am	0500	5 pm	1700
6 am	0600	6 pm	1800
7 am	0700	7 pm	1900
8 am	0800	8 pm	2000
9 am	0900	9 pm	2100
10 am	1000	10 pm	2200
11 am	1100	11 pm	2300
Noon	1200	Midnight	2400

Therefore, 1.15 am is expressed as 0115 whilst 1 15 pm is 1315, 15 minutes past midnight is 0015, an so on.

UTC is the mother of al world standard times — the reference used by all time zones — originally 24 each being an hour apart

In Australia there are three time zones — Australian Eastern Standard Time (AEST), Central Standard Time (CST) and Western Standard Time (WST). AEST is 10 hours ahead of UTC, CST nine and a half hours and WST eight hours.

At midnight UTC it is 1000 hours AEST. Think about that for a minute! That is a concept which has to be fully understood to avoid using the wrong date in relation to UTC. Between midnight AEST and 1000 AEST is the day before in UTC which is 10 hours behind — a grasp of this will ensure the correct UTC date is calculated

Those living in South Australia, Northern Territory and Western Australia should relate the above explanation to the conversion of their own time zone to UTC

Some radio amateurs simply calculate the conversion to UTC in their head. Others make up a table converting their local time to UTC and refer to it when necessary, whilst another solution is to have a clock in the shack always set to UTC. This can make an interesting talking point when visitors query the time on the clock.

The accuracy of your clock can be checked against the time pips heard on most commercial and ABC radio stations on the AM broadcast band, or the Telecom "Dial the Time" service.

A number of countries, including Australia, provide time signal broadcasts. The future of the Australian service, under the call sign of VNG, was in doubt at the time this article was written.

The United States service, WWV from Colorado and WWVH Hawaii, broadcasts on 2.500, 5.000, 10.000 and 15.000 MHz — WWV also transmits on 20 MHz.

Other time services using these frequencies include JJY Japan, RWN USSR, ZUO South Africa and LOL Argentina.

DON'T GET CAUGHT BY DAYLIGHT SAVING

Mention must be made of Daylight Saving Time — which can be a trap for new players in the UTC conversion game.

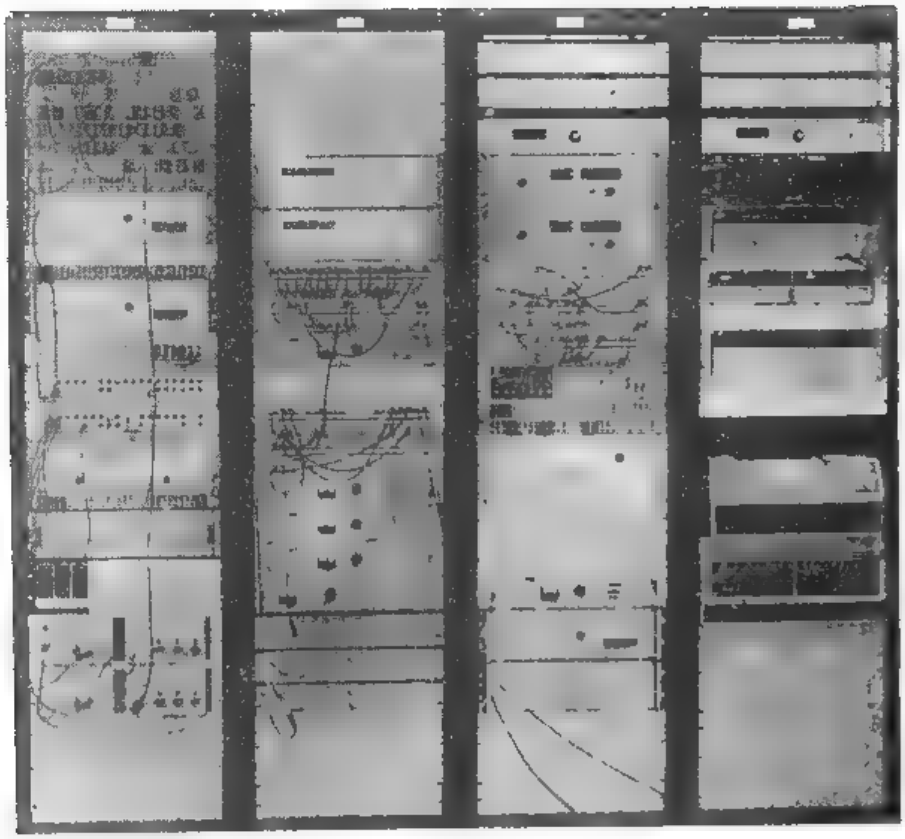
UTC does not change in relation to Australia's three standard time zones, when most states turn their clock ahead for one hour during Daylight Saving. UTC remains 10 hours behind AEST (or 11 hours behind Australian Eastern Daylight Time (AEDT)), nine and a half behind Central Standard Time (10½ behind Central Daylight Time (CDT)) — Queensland, Northern Territory and Western Australia do not adopt Daylight Saving.

During World War One, Daylight Saving was adopted in Australia, Britain, Germany and the USA, to conserve fuel by cutting the need for artificial light. It was re-introduced in Australia and elsewhere during World War Two, and

VNG Time Signal Transmission Schedule

Times of Emission UTC	*Frequency MHz*
0945-2130	4.500
2245-2230	7.500
2145-0930	12.000

VNG welcomes reception reports and does QSL. For general information and QSL cards write to the Reference Measurements Section, Telecom Research Laboratories, Box 249, Clayton, Vic. 3168.



Distribution Rack.

some countries had Daylight Saving all year round for several years in a row.

In the summer of 1967, Tasmania brought in Daylight Saving for the first time post-war as an energy conservation measure. This resulted in a renewed interest on the mainland and in October 1971 it was adopted for a trial by the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria.

The scheme was unpopular in the "Sunshine State," Queensland, which dropped it after the summer of 1971/72. Controversy continues in Queensland on Daylight Saving with recent suggestions for it being given another trial.

Western Australia adopted it only briefly and it has not been used in the Northern Territory, post war

HISTORY OF STANDARD TIME ZONES

Time for early man consisted of daylight and darkness, the changing lunar phases and the [redacted]

Astronomers, through their observations of the skies, found that the sun moved slowly eastward among the stars to make one full cycle around the sky in one cycle of the seasons.

Historians cannot agree on who first divided the days and nights into hours — the Babylonians, Egyptians and Greeks get the credit in various references. The Egyptians and the Romans also share the credit for dividing hours into minutes and seconds.

In the early days of Australia, each town, indeed each family, kept its own time as indicated by the sun

State Historian of Victoria, Dr Bernard Barrett has done considerable research on the significance of clocks and time in the development of Australia. He said the first public clock in any Australian town was probably one which a jeweller displayed in his window. But should there be more than one jeweller, their clocks would differ in time

Dr Barrett said it was the practice, in such circumstances, for a public meeting or event to be advertised as "starting at 8 pm by Mr Smith, the jeweller's clock."

He said clocks and time began to become more important in the 1850s with the development of railways. "The railways had to have the same time at both ends of the line — this was Melbourne time — not Geelong or Ballarat time.

"Development of the telegraph in the 1850s enabled Melbourne time to be flashed throughout Victoria — even so a country town could find that its Post Office Clock and Railway Station Clock frequently did not agree," Dr Barrett said.

In the second half of the 19th century, economic and technological developments made life more complicated and there was an increased reliance on time. Factories, stores, and schools all had their arbitrary and standardised starting and finishing times. Towns and suburbs built splendid town halls with a clock tower to give an increasingly necessary standard time for all citizens.

Dr Barrett said: "Pocket watches, a status symbol on well-fed waistlines, became popular, and it was a daily ritual to set your watch by the town hall clock." However, it was still possible to miss a train or the post because of the lack of complete synchronisation between clocks.

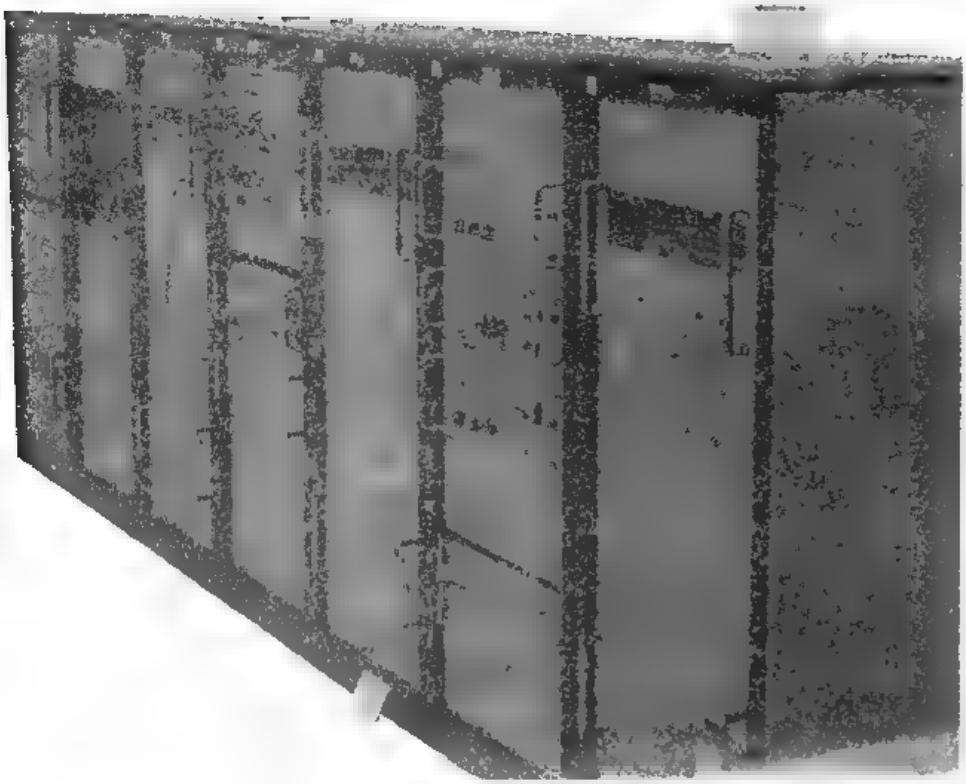
In the 19th century, each Australian capital city had its own local time — six capitals with six times. This was solar time — the difference came about because the sun rises earlier in Sydney than in Melbourne and even earlier still in Brisbane.

Dr Barrett said that was not so much of a problem in the early days because the six colonies were really six different countries with customs barriers at Albury-Wodonga and other places.

The idea of standard time zones based on Greenwich Mean Time originated in the 1870s. This began first in the USA and Canada, stimulated by the development of railways stretching ultimately from coast to coast

In Australia, interstate railways linked Albury in 1883 and at the Victoria/South Australia border in 1887

Caesium Beam Tube and Component Parts.



Caesium Beam Frequency Standards.

At Albury railway station there were two clocks, one for Melbourne Time and the other Sydney Time.

At an international conference held in Washington DC in 1884, attended by 25 nations, the concept of Standard Time was adopted with every clock to have the same minute and second, only the hour would be different. This resulted in the world having 24 Standard Time Zones, 15 degrees longitude or an hour apart, starting at Zero Meridian Greenwich.

Dr Barrett said government surveyors from the six Australian colonies agreed on this system in 1892. He said Australia was to have three zones — Western Australia was eight hours ahead of GMT, South Australia nine hours ahead and the Eastern States were 10 hours ahead.

The six colonies legislated accordingly in 1894/5 — but South Australia amended its time zone by half and hour in 1898 — nine and a half hours ahead of GMT. The change by South Australia was due to the geographic closeness of Adelaide to Melbourne.

South Australia's time zone was originally based on 135 degrees east, near Port Lincoln, but was moved to 142 5 degrees E, which runs through Broken Hill. Australian Eastern Standard Time is based on 150 degrees E (Gabo Island in far eastern Victoria on the New South Wales border, and Western Standard Time is based at 120 degrees E (between Perth and Kalgoorlie).

It is interesting to note that solar time varies by a minute for every 13 kilometres you travel east or west — or for every one degree in longitude it changes four minutes.

ACCURATE TIME-KEEPING

The International Conference of Weights and Measures in 1967, defined the second as the time interval taken for an atom of Caesium-133 to oscillate 9,192,631,770 times. *The Penguin Dictionary of Science* describes Caesium as a highly reactive silvery-white metal.

Atomic clocks use Caesium atoms placed in a resonant cavity tube which are subjected to an electro-magnetic field. The atoms flip back and forth from one magnetic pole to the other and keep doing this at a fixed rate as long as the field is at the exact resonant frequency of 9,192,631,770 Hertz. The count of the flipping atoms is fed back to the RF oscillator tuning varactor providing the field frequency which results in a high degree of stability.

A Surveyor at the Astro-geodetic Observatories, Division of National Mapping (Department of Resources and Energy), Dr John Luck said modern clocks use a 5 MHz crystal oscillator which is multiplied (synthesised) to get the required field frequency.

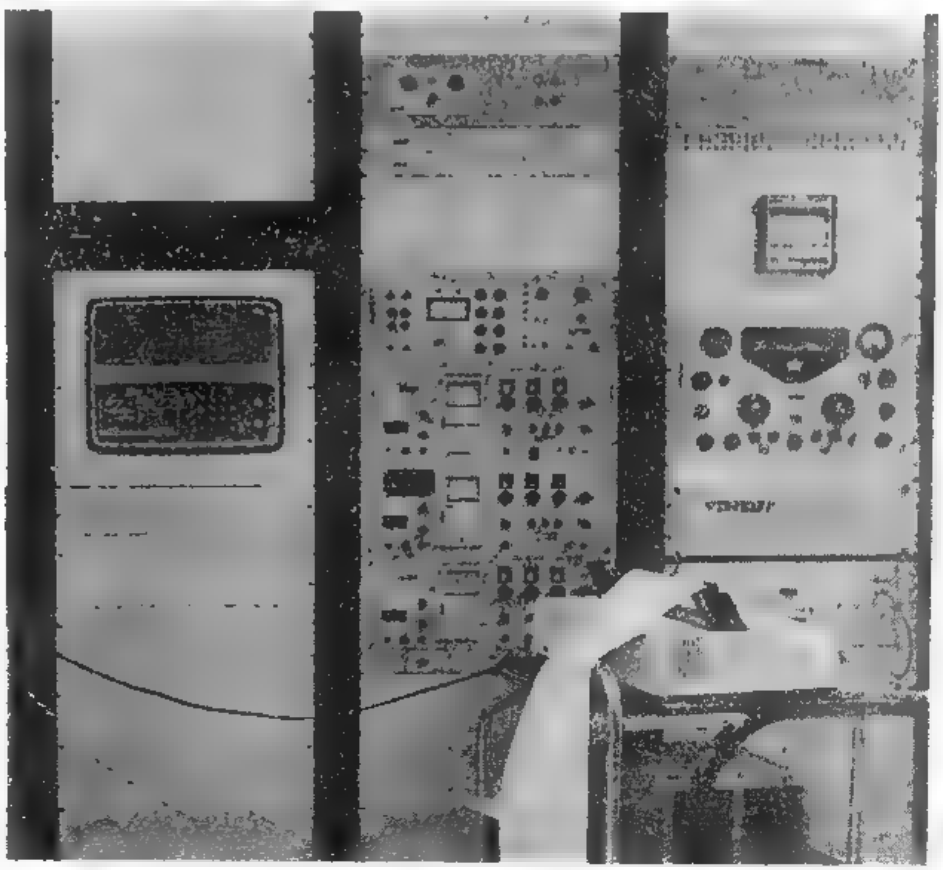
Dr Luck explained that pulses for time-keeping are taken off the 5 MHz oscillator through a divider network. He said atomic clock technology was introduced in Australia in 1967 at the Mount Stromlo Observatory, near Canberra — its function has since been taken over by the Division of National Mapping. Dr Luck said at the same time the CSIRO National Measurements Laboratory (NML) and Telecom (then the PMG) acquired atomic clocks.

The NML has the statutory responsibility for keeping UTC Australia and does so with assistance from National Mapping and Telecom.

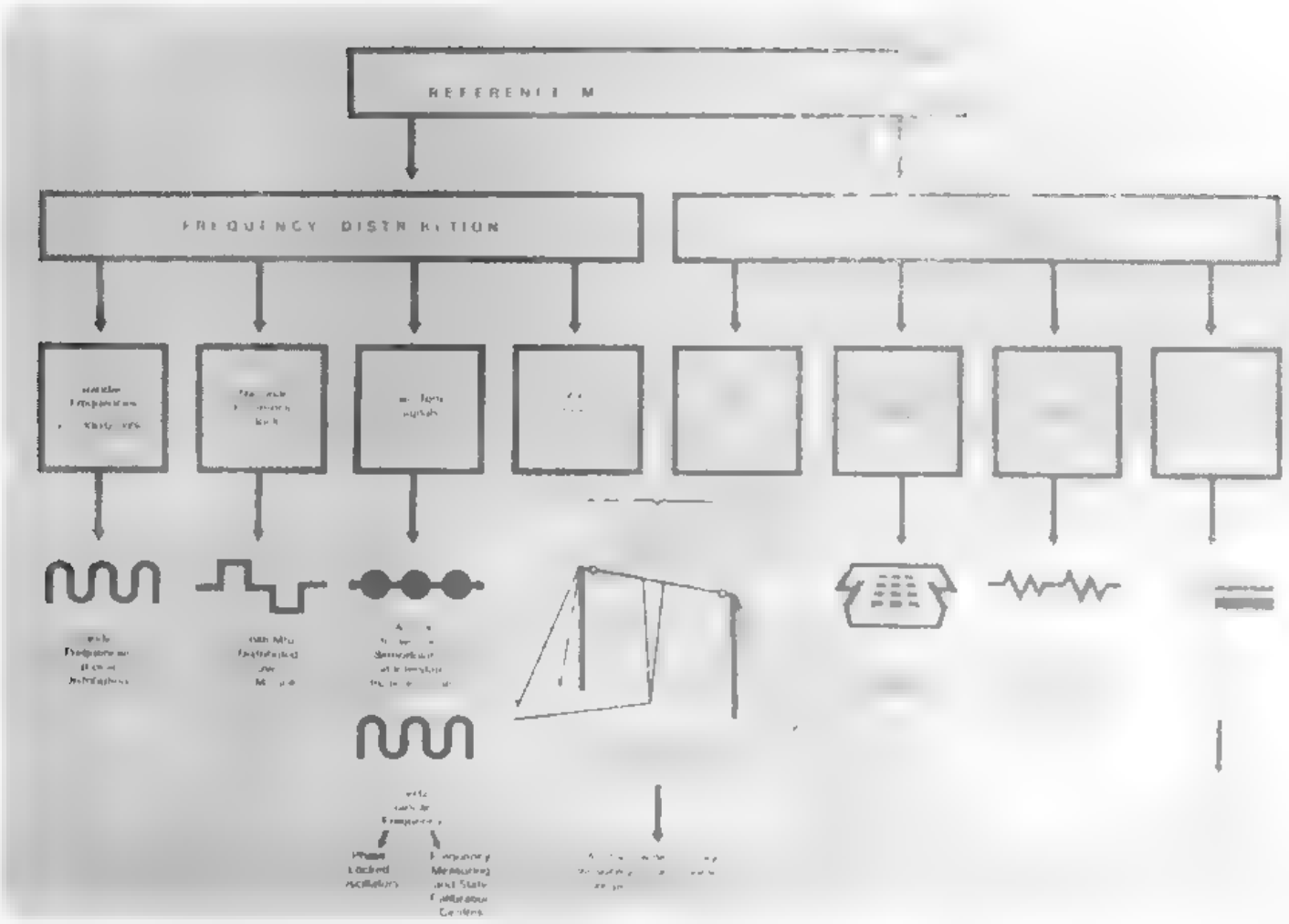
Dr Luck estimated there were about 50 atomic clocks in Australia including those used for military and space tracking purposes.

Experimental scientist, John Thorn, who looks after the NML clocks, said Australian atomic clocks compare one second pulses daily. He said the CSIRO checks its time with the US Naval Observatory (USNO) in Washington, DC, via the Global Positioning Satellite (GPS) system, and using the satellite a 100 nano-second accuracy was achieved between USNO and CSIRO. Mr Thorn said the system enabled an accuracy between clocks within Australia of 10 nano- seconds.

He said before GPS, time-keepers relied on a "flying clock" travelling to an "ensemble of clocks" around the world.



Receiver Rack.



Telecom Australia — Time and Frequency Services.

UTC was determined by a majority voting system — almost a consensus of clocks — producing a mean or "paper clock" as it is called

Every so often a "leap second" is added to UTC to take account of changes in the earth's rotation, or astronomical time. UTC is kept within an 0.9 second of its relationship with astronomical time and leap seconds when needed are added to the end of a month

Telecom, in an information booklet, said the Bureau Internationale de l'Heure gave its first preference for leap seconds to be added when needed at the end of December and June, and second preference is for March and September

The last minute of the chosen month has 61 seconds — the sequence is 2359.59 UTC, then 2359.60 which marks the start of the leap second that ends at 0000.00 UTC on the first day of the following month

Advance warning of leap second adjustments is included on most time signal broadcasts

In 1972, there were two leap seconds. Apart from 1980 and 1984, when there were no such adjustments, each year since 1972 has had a one second adjustment

The general public have access to time through Telecom's Reference Measurements Section. Assistant Director, Standards and Laboratory Engineering, Geoff Willis said time pips on radio stations originate from Telecom clocks through signalling equipment in capital cities.

Telecom also provides a "Dial the Time" telephone recorded information service and the VNG broadcasts. Mr Willis said: "The accuracy of these services are to about one 50th of a second due to delays in transmission

"The master clocks in Telecom are kept within one millionth of a second."

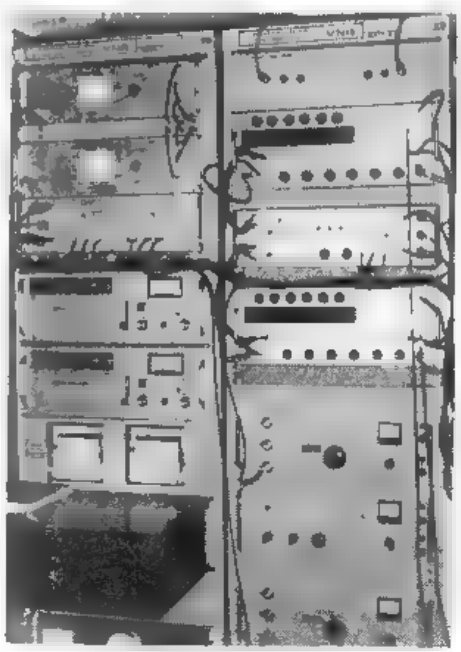
Finding answers to the question *What is time*? has been time- consuming. The author of this article hopes your time reading it has been time well spent.

FOOTNOTE:

South Australia will switch to Australian Eastern Standard Time at the end of the current daylight saving period in March 1987

■ a proposal to be put before Parliament, South Australia would also divide into two time zones during the summer months with the western half of the State — areas west of the 137 degree Longitude Line (which includes the towns of Port Lincoln and Ceduna and has a population of about 40 000 people) — being exempt from daylight saving.

The move is aimed at helping businesses trading with the eastern sates and will be welcomed by farmers who complain daylight saving costs them time and money.



VNG Racks.

NEWS REPORT FROM LONDON

AR'S London Correspondent,
Tony Smith G4FAI
1 Tash Place, New Southgate, London, N11 1PA, England.

UK PROPOSED DEREGULATION

Britain's Minister of State for Industry and Information Technology announced, April 2, the publication of a report by CSP International on Deregulation of the Radio Spectrum in the United Kingdom. CSPI, who are management consultants "specialising in telecommunications, information technology and radio spectrum usage," were commissioned to undertake a study on spectrum pricing by the Department of Trade and Industry, and throughout the study were overseen by a Steering Group chaired by a senior economist from the DTI.

Part one of the report concerns the fixed services, mostly in the UHF and microwave frequency bands. The second part examines the fixed satellite service, and the third looks at all other areas of spectrum usage, including private mobile radio, broadcasting, amateur and CB radio, emergency services and other specialised needs.

The report recommends that for substantial portions of the spectrum a new form of licence, a "Spectrum Management Licence" (SML) should replace existing licences to operate radio equipment. Such a licence would be issued to Frequency Planning Organisations (FPOs) who would be primarily concerned with sub-licensing use of the spectrum on commercial terms to end users.

• • •

UK amateurs have awaited the publication of the report with some apprehension because of the possibility of finding themselves in direct competition with big commercial users for use of radio frequencies in a "market-place" type situation.

The report's comments on amateur radio are as follows:

Amateurs and citizen's band users

We accept the argument that the spectrum allocation process should make some room for access by members of the public for non-commercial users, and for such use to be available on non-commercial terms. An analogy can be drawn with the allocation of land; although most land is allocated to owners for their private use by the price mechanism, parks are maintained by public authorities for recreational use by the public. It is our opinion that the quantity of spectrum set aside for amateur use is larger than economic considerations would dictate, although this judgment is difficult to prove quantitatively. Therefore, we would recommend that the UK government apply pressure in international discussions to avoid further increases in this allocation, or even to reduce existing allocations. However, so long as the principle of amateur use is to be recognised, the implication that amateurs must have access at a price consistent with their amateur status (as opposed to a price consistent with the commercial opportunity cost) must follow.

We propose therefore that amateurs should continue to enjoy a degree of protection in the following way:

— applicants for SML status should be required to accept the existing amateur allocations within their band (primary and secondary) for a minimum period of five years
— FPOs should also be required to accommodate any future amateur allocations, primary or secondary, when they are internationally ratified following WARC/RARC decisions.

Citizen's band (CB) radio presents a case somewhere between that of a amateur and that of other mobile radio users. Like amateurs, they are hobbyists whose use is (or should be) primarily recreational rather than functional. The similarity between citizens band and amateur radio has been increasing recently, due to the acquisition of amateur licences by increasing numbers of people with much lower technical skills (and a different motivation and orientation) than the traditional amateur radio enthusiast.

Nevertheless, we believe that the distinction between amateur and CB radio users is important, and should be reflected in their spectrum licensing status. The arguments for granting amateurs a degree of isolation from market pressures apply with less force in the case of CB radio, and we do not conclude that they should be insulated from the need to pay for spectrum used. Nevertheless, the fact that they are unprotected users (irrespective of the commercial, or recreational nature of their use) gives them lower priority as candidates for early transition to the status of FPO sublicensees.

• • •

The report recommends implementation of the new licensing arrangements in rounds. Round one would take in Fixed Services, Fixed Satellite Services, PMRs, Bands I and III, and Broadcasting Services.

Round two should begin three years after the date of the initial allotments and cover CB, services ancillary to broadcasting, and frequencies used by the entertainment industry for other than making broadcast television and music programs.

The process would then continue for 10 years until the majority of spectrum in the VHF, UHF and SHF bands, and selected bands at higher and lower frequencies have been allotted under spectrum management licenses.

Amateur radio is not specifically mentioned in the proposed timetable, and it can only be assumed that individual bands which happen to fall within a part of the spectrum allotted to a particular FPO can be taken into the system at any time during the implementation period.

The report is not yet government policy, and the DTI is inviting views and comments from existing and potential users of the spectrum, service providers and manufacturers of equipment. British amateurs can hardly be reassured by the proposals. Protection for just five years, coupled with an expressed opinion that they have too large an allocation of spectrum, and a recommendation that the government should seek to reduce allocations in future international discussions, should ring warning bells in every amateur shack, ***not only in the UK but around the world.***

■

RECIPROCAL LICENSING

Following is a copy of a letter dated March 12, 1987, sent by Mr D Hunt, Manager Regulatory Operations Branch, DOC in reply to the Ministry of Posts and Communications of the Solomon Islands.

This letter concludes almost three years of negotiations with regard to Licensing and Third Party Traffic arrangements.

Please note that, while the Third Party Traffic Agreement was already in force at this time, the Reciprocal Licensing arrangement did not come into effect until May 3, 1987

Dear Mr Mrs

I would like to refer to your letter of 3 February 1987 on behalf of the Ministry of Posts and Communications of the Solomon Islands government, concerning arrangements for the reciprocal granting of authorisations to permit licensed amateur radio operators of either country to operate their stations in the other country.

I have the honour to confirm that the above proposal is acceptable to the Department of Communications of Australia and that accordingly your letter together with my reply concurring with this proposal may be taken to constitute an arrangement between the Ministry of Posts and Communications of the Solomon Islands and the Department of Communications of Australia, to be effective two months from the date of this reply and to remain in effect until the expiration of six months after either party gives notice to the other of its intention to terminate this arrangement

To this end, I confirm the reciprocity levels contained in our letter of June 11, 1986, which reads as follows:

DEPARTMENT OF COMMUNICATIONS

Solomon Islands Licences	Australian Licences
Amateur Radio Licence (Unrestricted)	Full Privilege Amateur
Amateur Radio Licence (Restricted)	Limited Amateur Licence

I should also like to express my gratitude for your concurrence, as indicated in your letter of February 12, 1987, to permit third party traffic between amateur radio stations in the Solomon Islands and Australia.

Yours sincerely
(Signed) D Hunt
Manager Regulatory
Operations Branch
Department of Communications
3 March 1987

LICENCE CONDITIONS

In reference to the licence conditions which apply to relaying, recording and replaying of transmissions by amateur stations (paragraph 6.55 and 6.56 of the *Amateur Operators Handbook* refers).

Under existing licence conditions, Australian amateur stations are not permitted to relay the transmissions of another amateur station. Recording and replaying of transmissions back to the originating station is permitted subject to certain constraints. The exception to these provisions is for relays associated with approved Wireless Institute of Australia news broadcasts.

As readers will be aware, provisions have existed for sometime whereby, provided an amateur station licensee announces the station's identification, third party traffic can be originated via a telephone patch. Similarly, provided the station is under the "control" of a qualified operator who announces the station identification, any person may operate the station.

Recognising the aspects outlined and the parallel with retransmissions of other amateur stations, the Department of Communications has decided to relax the conditions applying to relays, recording and replaying transmissions. Accordingly, from March 25, 1987 Australian amateur stations may engage in retransmission (relays), recording and replaying of transmissions subject to the following conditions.

1 When retransmitting another amateur stations transmissions the licensee of an amateur station shall
a) not do so without the originating stations consent
b) remote the originating stations call sign from the retransmissions, and
c) insert their own station identification before and after each transmission indicating that it is a retransmission of another station.

2 If the originating station is recorded for subsequent retransmission purposes the licensee shall ensure that such retransmissions comply with conditions 1 a) to c)

The above is an extract from a letter from Mr D Hunt, Manager Regulatory, Operations Branch, DOC.

VI5JSA — Aeronautical Mobile

Jeffrey Thornton VK5BJT
29 Helmsman Terrace, Seaford, SA 5169

Two ordinary, everyday amateurs carried the Special Event Call Sign, VI5JSA, aboard a Cessna 172 for three hours.

Here I was, listening to the weekly Sunday Morning Broadcast when Graham VI5AQZ, mentioned during his Jubilee 150 update how great it would be to have VI5JSA in the air (on the air!). The call sign had been on almost every other mode of transport — train, paddle steamer, Clydesdale, Navy frigate, Grand Prix, etc — so the air was the next step.

Thoughts started to run wild in my head and after the 80 metre Callback, I went up to the Jubilee 150 80 metre frequency (3.586 MHz). There I met John VI5SJ and Graham VI5AQZ and volunteered for the job. My father, who happened to be in the shack at the time, thought it would be great fun (he has a Private Pilots License, you see!)

PREPARATION

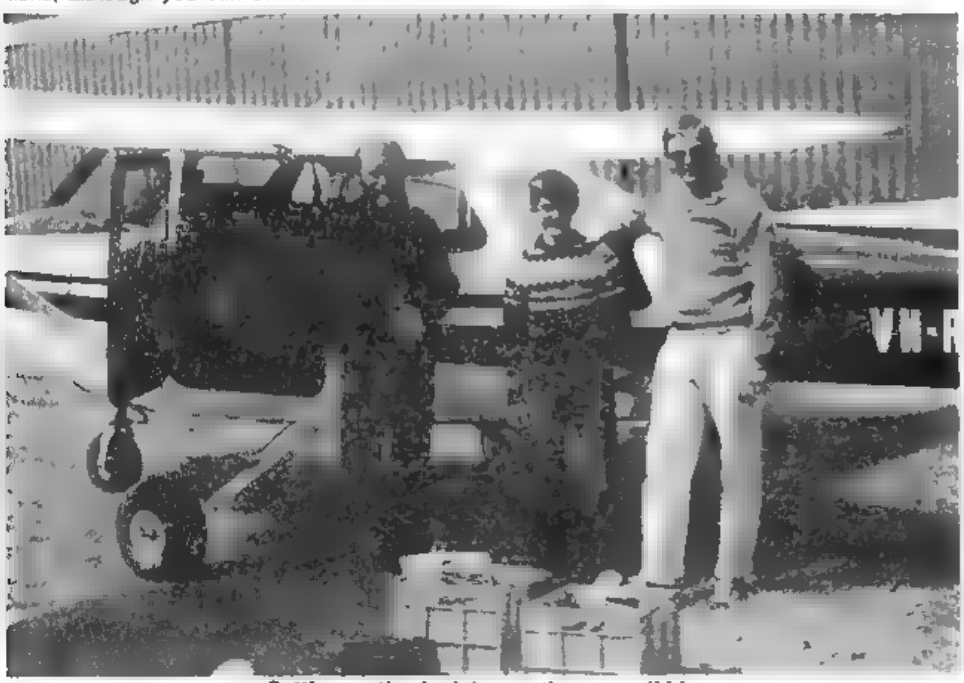
After a few calls to Graham, a date, December 20, was decided. As I only had a novice call sign, a full call operator had to come too, so I phoned a good friend, Trevor VK5ATR and convinced him that flying really was fun! ! ! (not really, he accepted readily).

The first thing to be done was to assemble suitable equipment. My HF rig was being repaired, but fortunately, although we had several stand-by rigs, was back in plenty of time for the flight.

Trevor brought two metres so he could work into the repeater. The aerial for HF posed a problem at first, but Dad suggested using a piece of wire trailing behind the plane. This was standard practice for aircraft HF communications, although you can be assured that their system is a little more elaborate than ours (but, after all, we are only amateurs). A 66 feet (20 metre) length of wire was threaded through a 4 feet (1 metre) piece of PVC tubing. The trailing end has a brick tied on to it for weight and the radio end was tied inside the plane with enough length to reach the ATU.

The final preparation was to ensure a plane for the necessary three hours on Saturday morning.

The Crew that Flew in VH-RFQ (from left) Trevor VI5ATR, Jeffrey VI5NTK (now VK5BJT), Michael (Dad) the pilot



Setting up the Aerial — on the ground! ! !

SATURDAY

After a fairly late night on Friday (no . . . not a party but acting as the J150 Net Controller using the South Coast ARC call sign, VI5ARC), I woke bright and early on Saturday. After breakfast, the car was packed, ensuring all the necessary bits and pieces were there, and Dad and I set off for the Aldinga Airstrip to meet Trevor at 6.30 am. Whilst Dad prepared the plane, Trevor and I adjusted the aerial and stowed the equipment on board. Once in the air, we slowly lowered the long wire and Trevor began using repeater 7000 (8). He quickly discovered that, at 2000 feet he could easily work everyone (in the suburbs) direct. Line of sight was much easier to obtain from the air.

After the Flight — assembling the equipment into some sort of order.

I began working on 3.586 MHz, then moved to 7.095 MHz (7.086 was busy) finally concluding with 21.186 MHz. I worked into VK2, VK3, VK4, VK5 and one ZL.

After a constant three hours it was time to get back to terra firma. About 80 stations had been worked.

CONCLUSION

As so many people talked to us, I must assume the exercise was a success. Sorry to all those who missed out, but better luck next time (in the year 2036? ! ?).

Thanks to our pilot, Michael (my father), Trevor VK5ATR, John VK5SJ, Graham VK5AQZ, and everyone who participated in J150. Thanks for making it great!

Printers Devil

The 'Printers Devil' didn't understand one of the calculations in the middle column of page 15 of the May issue and tried to obliterate it from the printing press plate. The calculation is reprinted below. Apologies to all and please amend your copy now.

$$NEP_{sig} = \sqrt{\frac{2\pi h c (\Delta f) W_{sig}}{\lambda}} \text{ watts}$$

Where Δf = Audio bandwidth (Hz)


COMM. RECEIVERS & SCANNERS
NEW BRILLIANT NRD 525
COMM. RECEIVER FROM JRC
Simply The Best! only $2299
ICOM
IC-R71A
MOST
POPULAR
RECEIVER ON THE MARKET
$1549
NEW KENWOOD R5000
Just
Released
$1175
FAMOUS AR 2002
World's most popular model
$949
UNIQUE IC-R7000 $1879
ICOM IC-R7000 is a top grade scanner with 99 memories, keyboard entry and many other features making IC-R7000 an ideal monitoring source
NEW — ANTENNA TUNER WITH LOW NOISE PREAMPLIFIER
ETP — 1
$159
CODE CONVERTERS
For short wave listeners
CB RADIO
Emtron Ace — Australia's most popular 40 CH general purpose hand held UHF CB transceiver
$599
UNIDEN
ELECTROPHONE
ICOM
VISIT OUR STORES FOR THE MOST COMPREHENSIVE SELECTION OF RADIO COMMUNICATION EQUIPMENT IN AUSTRALIA — COMMERCIAL, AMATEUR AND CB. THERE IS NO STORE LIKE EMTRONICS!
ANTENNAS
ANTENNA ROTATORS
REGULATED POWER SUPPLIES
DAIWA
ALINCO
WELZ
TEST INSTRUMENTS
NEW
KIKUSUI 60 MHz-TRIPLE TRACE OSCILLOSCOPE — COS5060
ONLY $2660.00
INCLUDES 2 HIGH QUALITY PROBES
NEW GW 20 MHz, DUAL TRACE OSCILLOSCOPE — GOS522
A heavy duty and accurate scope for service as well as production use
Features include ● Wide freq bandwidth ● Optimal sensitivity ● Extremely bright display ● Auto trigger level ● Variable hold off ● Alternate triggering ● DC trigger coupling
$855 Includes 2 high quality probes
10 MHz SINGLE CHANNEL CRO
$454
5MHZ OSCILLOSCOPE
GOS 955
$450
FREQUENCY COUNTERS
GFC 8010F (120 MHz) $392
GFC 8055F (550 MHz) $660
GFC-8100G (16 Hz)
$839
GUC-2010 UNIVERSAL COUNTER
$568
DIGITAL MULTIMETERS
CHECK OUR RANGE OF PROFESSIONAL MULTIMETERS
GDM 8135
$292
GDM 8135T
$373
(GDM 8045)
$500
Escort EDM 1111A DIGITAL MULTIMETER
$118
EDM 1105
$91
LCR METER Escort ELC 123
ANALOGUE MULTIMETERS SOLID PERFORMER BUILT IN BUZZER
ELC 120
RANGES
$264
ANALOGUE MULTIMETERS
SOLID PERFORMER BUILT IN BUZZER
● Transistor checker
● Mirror scale
● Fuse & diode protection
ST 380TR
$36
CORRESPONDENCE:
BOX K21,
HAYMARKET, NSW.
2000
EMTRONICS
MAIL ORDERS
WELCOME
NSW & HEAD OFFICE
92-94 Wentworth Ave, Sydney
NSW. 2000. TLX:AA73990
P.O. Box K21 Haymarket, NSW. 2000
Ph: (02) 211 0988
FAX: (02) 281 1508
VICTORIA:
288-294 Queen St, Melbourne
Vic. 3000.
Entrance from Lt. Lonsdale St.)
Ph: (03) 67 8551 or 670 0330
FAX: (03) 670 0671
QUEENSLAND:
416 Logan Road, Stones Corner
Qld. 4120.
Ph: (07) 394 2555
FAX: (07) 349 4316

JUNCTION FIELD EFFECT TRANSISTOR AMPLIFIERS

Don Law VK2AIL
RMB 626 Adelong Road, Tumblong, NSW. 2729

In the "olden days" it was common practice to trim meter multipliers by filing the side of solid carbon resistors.

In the earlier days of amateur radio, when we built most of our equipment, it was common practice to trim meter multipliers by filing the side of solid carbon resistors with a half round file (see Figure 1) The more you filed, the higher the value went, and the lower the meter current. If you went too far it meant starting again, with a new resistor.

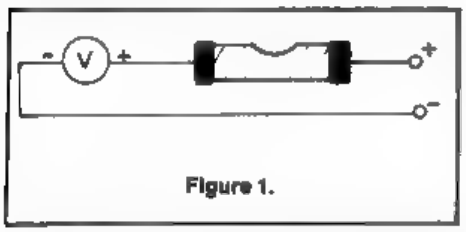


Figure 1.

What if the width of the conducting path could be electronically controlled? The device would then be able to amplify signals. Suppose the resistor were made of lightly doped silicon; that conducts and, like the carbon rod would have a voltage gradient along its length as a result of any applied potential difference. Assuming the rod or bar to be N- type Si, what would happen if a more heavily doped piece of P-type Si were fused into the side near the centre? (Figure 2.)

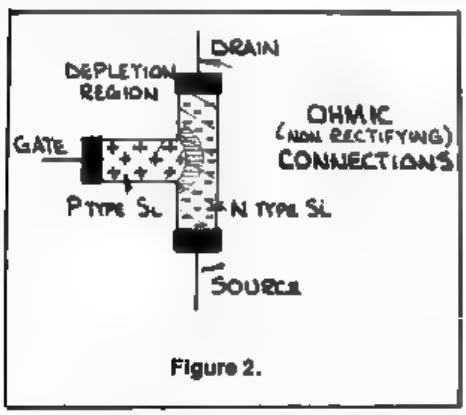


Figure 2.

Although both materials are conductive, on the bench (or in the bin) the junction would be a little like a dry joint. Holes from the P- type material migrate into the N-type and electrons from the N-type material migrate into P-type, creating a depletion region where no conductivity takes place. As with any Si P/N junction (diode) it would require a potential difference of approximately 0.7 volts, positive at the P-type Si to overcome this barrier and cause current to flow through the junction. But we are not interested in junction current, rather, current through the bar. Because the bar is less heavily doped than the P-type intrusion the depletion region extends further into the N-type bar than the P-type material. It narrows the conduction path and reduces any current that may be flowing. So far, we have done little more than a bit of electronic 'filing'; conditions are static. Let us examine what we can do with it. (Figure 3.)

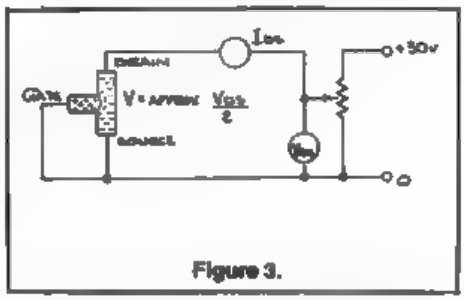


Figure 3.

The set-up allows us to examine how the current through the bar (Drain/Source Current (I_{DS})), varies with the Drain/in/Source Voltage (V_{DS}) and it should be noted that, since the junction is approximately halfway up the bar, the intrinsic 0.7 volts is augmented by about half of V_{DS} due to the voltage gradient across the bar. (Most J-FETs work okay with the drain/source connections reversed due to the junction being effectively mid-way)

In consequence, as V_{DS} is increased, a value is reached where the depletion region extends across the width of the bar and current through the bar is "pinched off" at some fixed value. Further increase of V_{DS} does not substantially increase I_{DS} above this value. (Figure 4.)

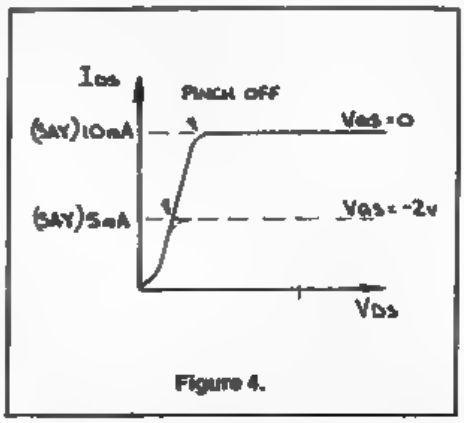


Figure 4.

This may be a current of from eight to 20 mA for a BFW10 and occurs at V_{DS} = 15 and V_{GS} = 0 (as shown in Figure 3). Figure 5 shows V_{GS} set at -2 volts. As V_{DS} is increased from zero, pinch-off will occur earlier due to the extra two volts reverse bias adding to the positive voltage at that point on the bar. Since V_{DS} is lower than before, the current through the bar will be smaller. A whole family of curves may be plotted using a range of bias values. (See dotted curve, Figure 4).

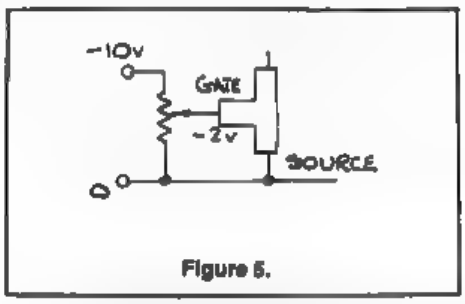


Figure 5.

It follows that, with an input signal swinging from zero to minus four volts, I_{DS} would swing from 10 mA to around zero and that the inclusion of a load resistor R_D would provide a voltage output and gain; an amplifier.

Because gate current is *not* allowed to flow, the input impedance is extremely high and, since the device normally operates in the 'plateau' region, Z out is also quite high. (Refer to Figure 4).

The I_{DS}/V_{GS} or mutual conductance characteristic (Figure 6) illustrates how amplification is possible.

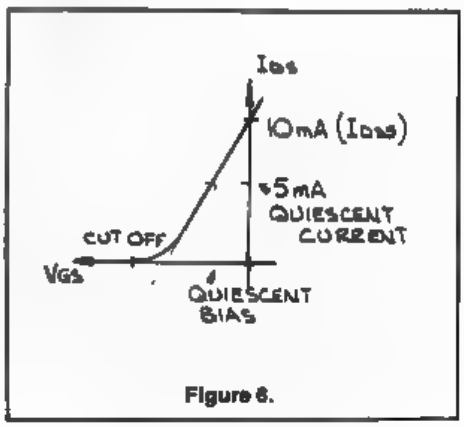


Figure 6.

It shows how the drain/source current (I_{DS}) varies with gate/source voltage, (V_{GS}) and clearly defines cut-off. (Some texts indicate pinch-off where the curve crosses the zero bias line (I_{DSS}) but clearly, operating within the plateau region, the device is surely 'pinched-off" for the entire curve).

Since the shape of the curve is common to all J-FETs it may be used to determine circuit values. Most important is the fact that the linear part of the curve projects to approximately half the cut-off bias value and that the operating bias is half of this, or $V_{GS(cut\text{-}off)}/4$. Manufacturers parameter spreads are so wide for J- FETs that accurate design becomes a problem Figure 7 shows a typical circuit employing a source

resistor for biasing which, due to negative feedback (DC), affords a large degree of independence of these vagaries. (Similar to the use of an emitter resistor in BJT circuitry).

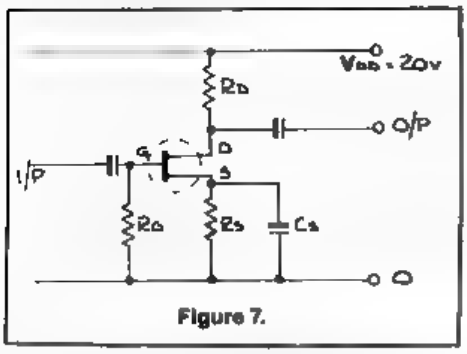


Figure 7.

Figure 7 illustrates a complete audio J-FET amplifier. Let us look up the data for a 2N5459 (Courtesy of Dick Smith's Catalogue).

$V_{GS(OFF)}$
= 2 to 8 at V_{DS}
= ÷ 15,

I_{DSS}
= 4 to 9 mA at V_{GS}
= 0,

Yfs
= 2000 to 6000 μmhos.

Due to the effect of R_S it is satisfactory to use mean values, ie

$V_{GS(OFF)} = 5$,

$I_{DSS} = 6.5$,

Yfs expressed as Gfs = 4 mA/volt

$$\text{Thus } R_S = \frac{V_{GS(OFF)}}{4} \div \frac{I_{DSS}}{2} \text{ (see Fig 6)}$$

$$= \frac{5}{4} \div \frac{6.5}{2}$$

$$= 0.384 \text{ k } (390\ \Omega \text{ pref})$$

$$\text{and } R_D = (V_{DD} \text{ (say 20 V)} - V_{DS}) \div \frac{I_{DSS}}{2} = \frac{5}{3.25}$$

$$= 1.538 \text{ k } (1.5 \text{ k pref})$$

(Note that I_{DSS} refers to I_{DS} at V_{GS} = zero)

Because I_{GS} is 1 μAmp or less, R_G may be very high. (1 Megohm or more). Since no direct current flows through R_G there is no volt-drop across it and V_G (quiescent) = ground zero.

The unloaded stage gain is:

Gfs X R_D = 4 X 1.5 = 6,

V_S = +1.25,

V_D = +15.125

The maximum undistorted output voltage swing is nearly $10V_{p-p}$.

Where BJTs bottom, (V_{CES}), at less than a volt, because of the intrinsically high channel resistance and the conditions for 'pinch-off' J-FETs do not. As a straight out AF amplifier, the BJT leaves it for dead regarding voltage gain but it does have a very high input impedance, a reasonably high output impedance and a low output Z as a source follower. It may be used to advantage in conjunction with BJTs. As an RF amplifier, where the DC resistance of the load (tuned circuit, etc), is very low, the MPF102 will work quite satisfactorily on a nine volt supply (The calculation for R_S is as for AF usage).

Coupled with very low noise figures and large input voltage handling capabilities is its extreme linearity. A useful front end device to counter cross-modulation. It has its place in numerous signal processing circuits including low level television modulators.

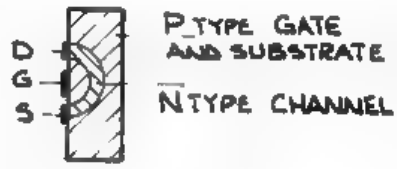


Figure 8.

Of course, the J-FET is not made as a bar with a slug in the side, but as drawn in Figure 8. The principle of operation remains true.

ar

RADIODES

A TIMELY THOUGHT

Official time is not the same as that which nature planned,
The sun when at its zenith doesn't mean midday at hand.
There's many a name to indicate the variations used,
And some folk say than none of them can really be excused.

The difficulties multiply when travelling at speed,
Provided moving east and west is really what you need.
The time you start may soon become the time you arrive,
Or else time will go twice as fast no matter how you strive.

When using rays that travel just as fast as those of light,
The various times in use can really put us in a plight.
For then we are two-timers though so honest we may be,
And my time is not your time if you're far across the sea.

So when making timed appointments for meeting on the air,
Remember that in all the world there's but one sun to share.
When in Sydney evening shadows are so long upon the lawn,
Folk in London, just awaking see the glimmer of the dawn.

For many years we have agreed that Greenwich time is best,
To use as handy reference between the east and west.
This means that from all different times we are at least set free,
As long as we can calculate the hours in GMT.

—"Hamberd" (Originally printed in the Nigerian ARS Newsletter 1970s)

Equipment Review

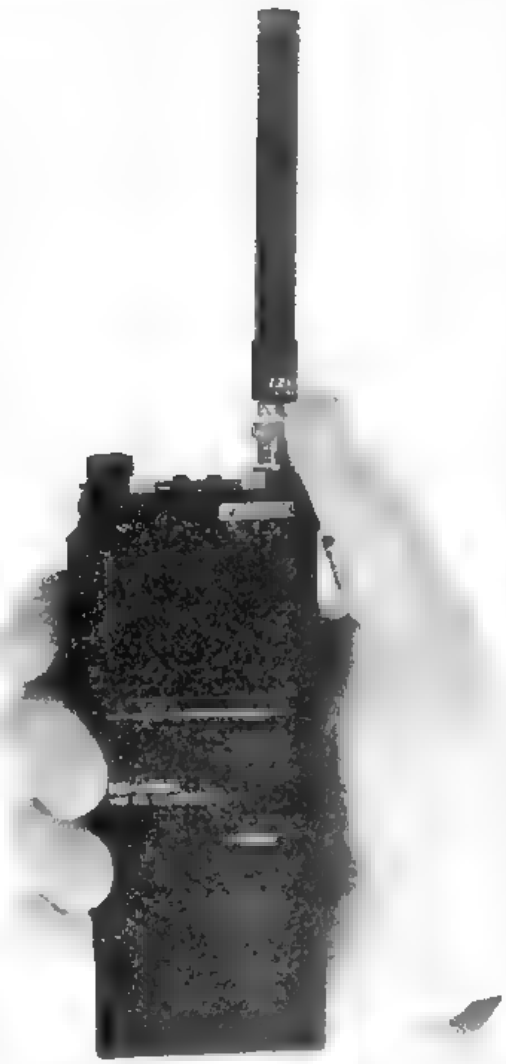
Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic. 3150

ICOM MICRO 2A — 2 METRE FM HAND-HELD TRANSCEIVER

It seems that similar to most equipment these days, hand- helds are getting smaller The first of these to reach our test bench is the new Icom IC-μ2A It is not clear at the present if this will replace the long-running IC-2A, which has been around since early 1980. There is no doubt that the 2A is the most popular hand-held ever to have been produced The new Micro 2A looks set to continue that tradition. When the original IC- 2A was released, I stated in the review (September 1980 AR) that 'The size is impressively small! It will fit easily into a shirt pocket and is certainly the smallest two metre hand-held on the local market.' I am not sure if shirt pockets are smaller in 1987 but if so the new micro will fit with ease

As a comparison, here are the overall dimensions of each, complete with the supplied antenna and battery pack. The IC-2A: 34.5, 6.5 and 4 cm (HWD) The weight, 470 grams The Micro 2A is 25.5, 6, and 3 cm (HWD), with an all up weight of 370 grams. Part of the difference is in the use of a shorter flexi-antenna on the new model

Out are the old thumb-wheel frequency switches, now replaced with three spring loaded up/down scan switches for MHz, 100 kHz and five kHz selection The basis of operation is via 10 memories, the frequencies for these being selected by means of the three up/down switches. There is then a fourth up/down switch to select the required memory channel. Frequency display is from a small, but very readable LCD display, which also indicates the memory channel number and incorporates an S-meter that doubles as an RF output indicator The display can be illuminated for night-time operation.



Power output is rated at one watt or 0.1 watts, selectable from a rear mounted slide switch. Also on the rear panel is the simplex, duplex selector switch Unfortunately, the offset information cannot be entered into the memory. Top panel controls, in addition to the frequency selection switches, include an audio volume/power on-off knob, a squelch control, CHK button which allows listening on the repeater input frequency and a sub-audible tone switch

Options available for the Micro 2A include a selection of battery packs to give either extended life or slightly higher power output The IC-HM9 speaker/ microphone, which was usable with the original IC-2A, is compatible with the Micro 2 also. Two headset/microphone units are also available, one with a VOX facility, the other with manual T/R switching.

IC-μ2A CIRCUITRY

The receiver side of the circuit bears a strong resemblance to the old 2A. It uses a double conversion set-up with a 16.9 MHz first IF (10.7 on the original 2A) and a 455 kHz second IF A crystal filter is provided at 16.9 MHz and a ceramic filter at 455 kHz The RF stage and first mixer are both 2SK302 FETs with a bipolar amplifier at 16.9 MHz As with the 2A, an IC provides the functions of second converter, 455 kHz IF and limiter-discriminator

Battery backup is provided for the memory operation and it is felt that it is worth quoting the following from the instruction manual 'The usual life of the backup battery is one to two years. Monitor the backup battery carefully and replace it if there are repeated cases of display malfunction. Note Battery replacement should be done by your nearest authorised Icom Service Centre. If the internal backup battery is exhausted, the IC- μ2A transmit and receive functions will still operate but no frequencies can be memorised in the memory channels." I am slightly concerned that the battery life is quoted at only one to two years. Only time will tell.

One of the nice features of the μ2A is the special power saving circuit. If no signals are received or switches operated for more than 30 seconds, the receiver drops into a standby mode where the current drain drops to one quarter of normal If you use the transceiver for monitoring purposes this will result in very greatly extended battery life

The transmitter final stage uses a 2SC1947 with two driver amplifiers fed from the CPU controlled PLL circuits. Diode switching is used for all transmit receive change-over functions.

ON THE AIR

Whilst the measurements of the Micro presented earlier might not indicate that this transceiver is all that much smaller than its predecessor, it's not until you actually get it in your hand, that its small size becomes apparent. Dialling up the required frequency is very easy.

Holding the switch either up or down causes the frequency to scan up or down in one MHz, 100 kHz or five kHz steps Just release the switch when you reach the required frequency. Once selected, the frequency is automatically entered into whichever memory channel is selected at the time Perhaps the only criticism is that it might have been easier if the last five kHz position be optionally changed to 25 kHz. This would suit our band plan for FM somewhat better than the present system.

AUDIO OUTPUT

The audio quality from the very small speaker proved to be very good, although audio output was somewhat limited for mobile operation An external speaker or the HM9 speaker/microphone would be a suitable way to overcome the problem Reports on the transmitted audio quality were always complementary. The signal had a sharp crisp sound and the deviation seemed to be well set

ILLUMINATION

One of the nice features was the excellent illumination of the LCD readout A single push of the light switch located near the PTT bar kept the light on for about four seconds, enough to take in

all the displayed information. In use it was felt that the transmitter was not accessing repeaters as well as expected. As we shall later see in the test section, this proved to be true.

ON TEST

The usual line-up of test equipment was used to produce our test figures. This included a Marconi TF 955A/5 RF Signal Generator, AWA F-242 Noise and Distortion Meter, Daven Terminating Audio Power Output Meter and a Marconi TF-957/1 RF Power Meter.

First, the current drain was measured. On receive, with the squelch operating, but no audio output, the current drain was 25 mA. After 28 seconds of operation with either no signal input or control changed, the receiver drops into 'standby mode.' The current drain then cycles between about 4 mA and 10 mA over a one second period, giving an average standby current drain of about 7 mA. Receive audio power was next checked when the external speaker was terminated firstly into an eight ohms load where the maximum power was 0.375 watts but with 35 percent distortion. At 0.2 watts output, the distortion was down to a more reasonable figure of five percent and at 0.1 watts output, it was an excellent one percent. Output and distortion were also checked with a 4 ohm load, but little notice was noted in the above figures. As can be seen, the total audio power available is rather limited but not dissimilar to most other hand-held transceivers.

RECEIVER SENSITIVITY

The receiver sensitivity and S-meter calibration was checked. At 0.16 uV pd the SINAD measured 16 dB. The squelch, when set to the threshold, opened at about 0.1 uV. The S-meter is not actually calibrated in 'S' units which is just as well because the indicating segments bear no relationship to real S-points. For what it's worth, the calibration was as follows:

1st segment	Squelch open
2nd segment	2.0 uV
3rd segment	2.5 uV
4th segment	3.1 uV
5th segment	4.0 uV
6th segment	5.0 uV

Not the greatest S-meter, but no doubt better than nothing. Receiver sensitivity on the other hand is very good indeed.

POWER OUTPUT

Transmitter power output was next measured. In the high power mode, it measured 1.75 watts and when switched to low power the figure was 0.1 watts. This is very similar to the older and larger IC-2A, but it soon became apparent that the transmit capability of the μ2A was well down on the old IC-2A. I therefore decided to check the performance of the helical stubby antenna supplied with the μ2A. The method used was as described in my article, *The Long and Short of Two Metre Antennae for Hand-Helds*, (AR December 1984). It was found that the short μ2A antenna was about 4 dB down on the longer IC-2A helical. While 4 dB might not seem much, in actual use there is a very noticeable difference. A better antenna is recommended.

CONCLUSIONS

The Icom IC-μ2A performs very well indeed. The compact size is certainly a big feature. Its a pity that the supplied helical antenna is not a bit more efficient, compared with other helical antennas of even the same size, it is well down in performance. Perhaps Icom should consider changing their antenna supplier. The instruction book is, in general, well presented and, in fact, very similar to the IC-2A handbook. A circuit diagram is supplied, but as usual no technical information is included. Surely it should not be asking too much to include a few basic adjustment details such as transmit deviation. Icom service manuals are hard to come by and are usually very late in production.

Our review unit was supplied with a 115 volt battery charger which might not have worked very well on 240 volts. Nevertheless, I found that my IC-2A charger worked fine. Icom assure me that this was due to the review unit being an early model and that all transceivers being distributed are supplied with normal 240 volt chargers.

Our thanks to Icom Australia for the loan of the μ2A transceiver for this review.

EVALUATION AND ON-AIR TEST AT A GLANCE

ICOM IC-μ2A FM TRANSCEIVER Serial No 01215

APPEARANCE

Packaging
- ***Strong carton with foam insert

Size
- ****Its amazing how they fit it all in

Weight
- ***You will not know you are carrying it

External finish
- ***Very pleasing finish

Construction quality
- ***Appears to be Icom's usual high standard.

PANEL CONTROLS

Location of controls
- ***Logical layout

Size of controls
- ***Relative to the size of the rig very good

Status indicators
- **Transmit indicator only.

RECEIVER OPERATION

Memories
- **Ten memories with no repeater offset included.

S-meter
- *Only just better than nothing

Frequency Display
- ***Small but clear. Very well illuminated for after dark use

Sensitivity
- ***Very good. See test results.

Signal handling
- ***Very good for a hand-held.

Internal speaker
- **Clear distinct quality, but rather limited output power capability

Listen on input facility
- ***Push button listen on input for repeater operation. Does not allow reverse transmit

TRANSMIT OPERATION

Power output
- ***Similar output to the old IC-2A in a much smaller package

Battery drain
- ***Not excessive on transmit. Overall with low average drain on receive very good indeed

Metering
- **Output indication only

Audio quality
- ***Crisp clean audio.

Antenna efficiency
- *Well down on input. See test section.

Battery life
- ***With the current saver in use. Very good

MANUAL

Owners Handbook
- ***Lacks technical information but operating instructions very well covered.

OVERALL RATING
- ***The overall concept of this little hand-held is very good. If you require a compact two-metre FM transceiver, this one should be at the top of the list.

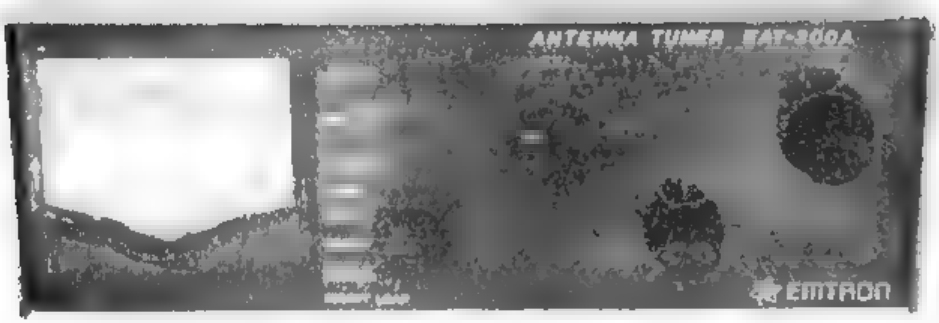
RATING CODE:

* Poor, ** Satisfactory, *** Very Good, **** Excellent.

Equipment Review

Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic. 3150

EMTRON EAT-300A ANTENNA TUNER



For some years now, Emtronics, under the direction of Rudi Breznik, have produced a wide range of antenna couplers, SWR meters and other ancillary items for the Australian amateur radio market. Rudi is to be congratulated for being one of the few to get into the rather limited Australian market.

Emtronics state in their advertisements that over 800 famous EAT-300 ATUs have been sold which would have to rate as a very good achievement.

The new EAT-300A is an improved version of the original 300 and provides the following facilities:

Matches everything from 1.8 MHz to 30 MHz and includes a built-in balun to feed a balanced line feeder, which was incorporated in the earlier model. The EAT-300A has the additional attributes of a cross needle forward and reverse power meter and a six position antenna selector switch. This permits the selection of a balanced line antenna, a long wire, two coaxial fed antennas, a coaxial fed antenna which bypasses the tuner or a final position that switches in a 100 watt dummy load.

The standard of construction is excellent with high quality components and first-class wiring. The cross needle power meter is of the Diawa type with two power scales of 20 and 200 watts. The metal cabinet is solidly built with an excellent enamel finish.

ON TEST

The tuner was set up with various antennas to test its ability under typical operating conditions. However, before starting the tests a few questions arose. The EAT-300A is rated at 300 watts but the power meter only reads to 200 watts. A little strange to say the least. Also, advertisements for the EAT-300A rate the dummy load at 100 watts, but the operating manual supplied with the tuner gives no specification at all. It just states *Do not apply full power out of your transmitter for longer than 1 (one) minute.* Perhaps I could ask what the full power output of your transmitter is.

The initial test was with a 100 watt output transceiver feeding a balanced transmission line to a centre fed 80 metre dipole. I have, in fact, been using this type of antenna for the last 25 years with good results using a Johnson Matchbox ATU.

The 300-A was able to tune up this antenna on all amateur bands from 80 to 10 metres, including the new WARC bands. It was noted though that the tuning on most of the bands was extremely critical. As the balun used to couple to the balanced line output was rather small, I expected that it might run hot after some extended operation with 125 watts output. However not so, it was stone cold after a couple of hours operation. Nevertheless, the air wound inductor used to tune the lower frequency bands became too hot to touch. I would suggest that if a full 300 watts had been used, the plastic supports used as the coil former would melt in a very short time. I should mention that this only occurred while testing on the 80 metre band. As a further test, I ran 100 watts through the tuner for one minute and then measured the temperature of the wire. It was 85 degrees Celsius. I hate to think what it might have been with 300 watts running through the tuner.

As the frequency was increased, the heating became less pronounced, with a slight warming being only noticeable on 20 metres.

It was also noted that tuning with 125 watts applied caused the capacitors to arc over although, with the unit correctly tuned, no trouble was noted. I would therefore recommend that initial tuning should be carried out with no more than about 50 watts applied from the transmitter. The 330A was tested with a coaxial input to a trap vertical antenna, which runs a high SWR, when used away from its resonant frequency. The tuner was easily able to cope with an initial SWR of up to 4:1.

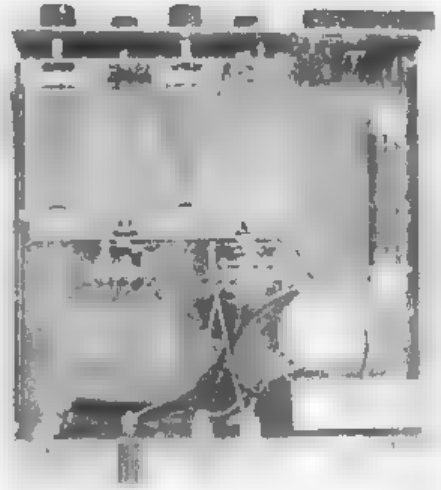
I did not try a random length of wire, but there are no doubts that the tuner would be able to load a transmitter into the proverbial piece of 'wet string'. The power meter readings proved to be very accurate when checked against my Drake W4 which in turn is regularly checked against a professional Bird Thru-Line wattmeter.

Rear View.

CONCLUSIONS

The Emtron EAT-300A is a very well constructed antenna tuner. It is felt that its advertised power rating of 300 watts is very optimistic. I would suggest that 100 watts is nearer the mark. This would certainly fit better with the 200 watt full scale reading power meter.

However, the greatest disappointment is the so



called operating manual. This consists of four pages (one being blank) of poorly presented information. There is no specifications included in the 'manual' and it is necessary to refer to Emtronics advertisements to work things out.

If you need an all band ATU, the EAT-300A is certainly very much better value than many of the imported units. It will cope with most feeder matching requirements encountered in the average amateur shack. My thanks to John Hill of Emtronics Melbourne outlet for the loan of our review unit.

ANTENNA RANGE

AUSTRALIA'S LONGEST MODERN ground reflection antenna test range has been set up by Telecom at Caldermeade, south-east of Melbourne.

With a range length of up to 2500 metres, it will be used by Telecom for antenna measurement and analysis work from VHF and UHF bands to the microwave and millimetre wavelengths.

Major features are a receiving and transmission site, linked by a computer- cased measurement and control system. At the receiving end is a 30 metre tower fitted with a crane, rotators and positioners needed to mount and control under test antennas.

The transmitting site consists of a trailer mounted tower on which the transmit antenna height, orientation and polarisation can be varied.

Mobile cranes can enter the site to mount antennas of up to 10 metres diameter weighing up to 6000 kilograms on the receiving tower.

The range in which Telecom has invested $1.3 million has attracted the interest of government departments, OTC, CSIRO, private industry and universities interested in having their antennas tested.

Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
PO Box 883, Frankston, Vic. 3199

Out of all the comment and debate about proposals for examination systems there came a number of criticisms of the current procedures. Some members argued strongly for a move away from the multiple- choice questions, a change in the pass-mark, a two-level paper, or a lower standard entry to the hobby.

Most of these proposals have been debated previously, and the debate continues. They are perhaps topics which the committee considering the "Future of Amateur Radio' should be including in their brief. But I would like to add a little more to the discussion about multi-choice questions

Those of us who gained our licenses by passing an essay-type examination generally had it fairly easy.

Admittedly, there was no set syllabus, but copies of past question papers could be had for the asking, and it was only necessary to collect two or three years' papers to establish the range and type of question likely to appear

By preparing and remembering answers to 10 or 15 questions success was virtually assured.

The questions were straight-forward and not liable to misinterpretation. But — this type of question requires a technically competent person to spend significant time on its marking, and the mark awarded may vary according to who marks it

As the numbers of candidates began to rise, the t me taken for marking these questions became so significant that in the late 70s results were taking months to arrive.

The moral of all this is that an essay type question is easy to set, but hard and time-consuming to assess.

The multi-choice question, however, is very easy to mark, and its mark is not affected by the bias or attitude of the marker. In fact, the marker need have no technical knowledge at all

But *good* multi-choice questions are very hard and time consuming to set. (Bad ones are easy).

So on balance, it should be as economic in terms of manpower to set and mark a nine question essay paper as a 50 question multi-choice paper — and it probably would be if the questions had to be produced fresh for each

Once a bank of multi-choice questions is established, however, questions can be re-used many times. They can be selected so that any subsection of the syllabus can be examined, and the weight given to each section can be varied by altering the number of questions included from that section.

So a multi-choice examination can be much more searching than an essay- type, both in range of topics covered and in degree of depth. The strength of such a system lies in the number of questions on each topic in the bank. If the bank is large enough, the whole thing can be published as the candidate has no way of knowing which questions will appear on any one paper.

Complaints about questions generally relate to the wording of the question being unclear, or the possibility of two (or no) correct alternatives.

A good question should not require the candidate to spend time working out what is being asked, but it is often necessary to make the wording precise to ensure that the desired question is the one being asked. It is up to the candidate to read all of each question.

Two correct alternative is a problem that may arise if the candidate's knowledge and background are such that he can see possible situations beyond those required for the sy labus

It is almost impossible to set a paper without any risk of misinterpretation

Candidates should be exposed to as wide a range of questions as possible, and should read them not only to find the answers but also to become aware of the finer points of detail or wording

If an unanswerable question does arise in an exam nation, it should be brought to the attention of the supervisor or DOC.

Candidates who have complaints are invited to let me know of the problems, and I will approach DOC on their behalf

If faulty questions are found they can be corrected or removed from the bank

I look forward to hearing all the new call signs that should be appearing about the time this is published

—73, Brenda VK3KT

Know your Second-hand Equipment

Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic 3150

THE TRIO KENWOOD RANGE continued

This month we w ll look at some of the early VHF transceivers produced by Trio Kenwood.

As with their HF equipment, Kenwood took quite a while to get established in Australia and some of their early models were not sold in large quantities It is also interesting to note that Kenwood Trio two metre FM transceivers were sold in the United States of America under the Drake brand name during the 1973 to 1976 period.

THE TRIO TR-7100

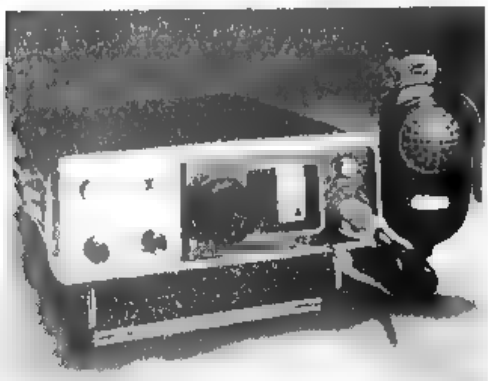
This two metre FM receiver was the first of the brand to be available in Australia. I was lucky enough to own one of these in the early 1970s. It was a fully solid-state transceiver with 10 watts output. There were 12 switched channels and, as with many of the early two metre transceivers, there were usually three sets of crystals for frequencies n the 144 MHz region. These became known as Japanese channels and were frequently used for ocal simplex work ng

The general performance was quite good, but l ke the original YAESU FT-2, there was no means of netting the receive crystals onto the exact frequency With normal crystal tolerances, this was quite a problem

I cannot find any reference to the original price of the TR-7100 but I would think that the second-hand value today would be about $100 to $120, depending on the number of usable channels fitted

THE KENWOOD TR-7200

This was the first of the now Kenwood two metre transceivers to be widely distributed. I reviewed it in the September 1975 issue of *Amateur Radio*. Channel capacity was now up to 22, with an addition switch position for an external VFO input Kenwood did produce a matching VFO, but so far as I know, none were imported into this country. The 7200 was one of the first two metre transceivers to ncorporate a 'call' channel



The frequency insta led selector switch enabled one to select a channel by pushing the call button, regardless of the main channel switches position.

The TR-7200 was somewhat larger than most of its contemporaries but still very compact for the period. Actual measurements were 180, 60 and 240 mm (WHD) Weight was 2 5 kg. Performance was of a high order and test figures taken at the time surpassed most of the opposition. Price when new was $210 fitted with two or three channels. Secondhand value today would be about $120 to $130 again depending on the number of usable channels installed

THE KENWOOD TR-2200A AND THE TR-2200G

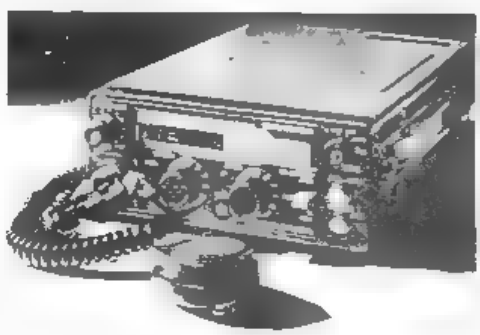
These two metre FM transceivers were of the portable type. They had provision for internal batteries and had a telescopic whip antenna that

could be extended from the front panel They were known as 'hand bag' portables, supplied with a shoulder strap, they were an alternative to the then new hand-held transceivers. While it might seem odd, the 'G' model was the first to be released with the 'A' model coming along later with several improvements including higher power output. The 'G' was rated at one watt output whilst the 'A' had selectable 0.4 or 2 watts output.

The size of both was the same at 135, 58, and 191 mm (WHD) Weight with batteries was 1.8 kg. Like most of the Kenwood equipment of the time, they have an excellent record of reliability. Receiver sensitivity was in general slightly better than the other makes. If you are looking for one on the secondhand market, try to find one fitted with Ni-cad batteries. Both had provision for 12 channels and, of course, like all the transceivers described so far, required two crystals per channel. Price when new over the period from 1974 to 1977 for the 'G' model and 1978 for the 'A' model was $220 to $275. Secondhand value today would be about $100 to $130.

THE KENWOOD TR-7400A

This model was released in 1977 and was Kenwood's first fully synthesised two metre transceiver. It also was capable of putting out 25 watts which was really something at the time. It was



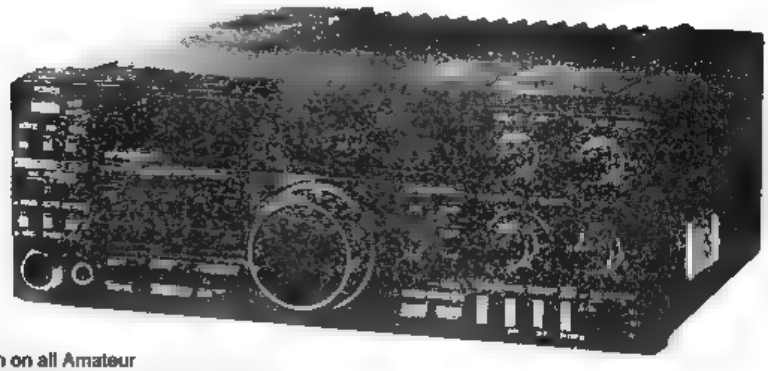
quite large for a mobile transceiver, measuring 182, 270, and 74 mm (WDH) Weight was 2.8 kg Frequency selection was via three controls, a lever switch for MHz and two rotary switches for 100 kHz and 10 kHz selection. The actual frequency was displayed on a red LED readout

A separate three position lever switch selected the required repeater offset or simplex operation The general performance of the 7400A was first class and although it was before the days of memories, frequency selection was simple and quick Price when new was in the $400 range Secondhand value today would be about $250

Finally, thanks to one and all who have written to me with suggestions for equipment that might be covered n future editions of this column. Given time, it will be included

"It's freezing here OM — the linear's not working!" —VK2COP

TS-440S
HF TRANSCEIVER



The TS-440S is an HF transceiver designed for SSB, CW, AM, FM and AFSK modes of operation on all Amateur bands including the new WARC bands. It is the ultimate in compact size with the automatic antenna tuner built-in and featuring a highly efficient final amplifier cooling system. It incorporates a 100 KHz to 30 MHz general coverage receiver having superior dynamic range. Advanced digital technology controls the various functions, including dual digital VFOs, 100 memory channels, keyboard frequency selection, memory and programmable band scan, and RIT plus XIT. Additional operating features include full break-in CW (switchable to semi break-in), built-in automatic antenna tuner, IF shift, notch filter, IF filter selection, RF attenuator, speech processor, and other features for ease of operation and added versatility.

TS-940S
HF TRANSCEIVER

The TS-940S is a competition class HF transceiver having every conceivable feature, and is designed for SSB, CW, AM, FM and FSK modes of operation on all 160 through 10 meter Amateur bands, including the new WARC bands. It incorporates an outstanding 150 KHz to 30 MHz general coverage receiver having a superior dynamic range (102 dB typical on 20 meters, 50 kHz spacing, 500 Hz CW bandwidth).

Engineered with the serious DX'er/contest operator in mind, the TS-940S features a wide range of innovative interference rejection circuits, including SSB IF slope tuning, CW VBT (Variable bandwidth tuning), IF notch filter, AF tune circuit, Narrow/Wide filter selection, CW variable pitch control, dual-mode noise blanker, and RIT plus XIT.

TL-922
HF LINEAR AMPLIFIER

The TL-922 is a band linear amplifier designed to provide maximum legal performance, utilising two 3-500Z high performance transmitting tubes. Incorporates class AB_2 round-grid amplifier circuit. Excellent IMD (intermodulation distortion characteristics).

VALVES NOT INCLUDED

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.

4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2066. Ph. (02) 428 1455.

YOUR DEALER BELOW WILL GUARANTEE SATISFACTION

Further, beware of dealers not listed in this advertisement who are selling Kenwood communications equipment. All Kenwood products offered by them are not supplied by Kenwood Electronics Australia Pty. Ltd. and have no guarantee applicable.

N.S.W.
KENWOOD ELECTRONICS AUSTRALIA PTY. LTD. - 4E WOODCOCK PLACE, LANE COVE (02) 428 1455
EMTRONICS - 94 WENTWORTH AVENUE, SYDNEY (02)211 0888
REG STOCKMAN COMMUNICATIONS - CNR BANOCKBURN ROAD & SHIRLEY STREET, arERELL (067) 22 1300
WORMALD COMMUNICATIONS - 51 DENNISON STREET, HAMILTON, NEWCASTLE (049) 69 1999
MACELEC PTY. LTD. - 98 KENNY STREET, WOLLONGONG (042) 29 9455
E & K COMMUNICATIONS - 14 DUTTON STREET, DICKSON, A.C.T. (062) 49 6437
DK ENGINEERING - 158 GRANITE STREET, PORT MACQUARIE (065) 84 9922
FRANK BOUNDY - LISMORE (066) 86 2145

INTERSTATE

VIC.
PARAMETERS PTY. LTD. - 1064 CENTRE ROAD, SOUTH OAKLEY (03) 575 0222
EMTRONICS - SHOP 5, 288-294 QUEEN STREET, MELBOURNE (03) 67 8131
BRIAN SOARES - 11 MALMSBURY STREET, BALLARAT (053) 39 2808
SUMNER ELECTRONICS - 78 KING STREET, BENDIGO (054) 43 1977
HOBBY ELECTRONICS - 477 NELSON ROAD, MT. NELSON (002) 23 6751
WATSONS WIRELESS - 72 BRISBANE STREET, HOBART (002) 34 4300
MARINE & COMMUNICATION - 19 CHARLES STREET, LAUNCESTON (003) 31 2711
V.K. ELECTRONICS - 214 MOUNT STREET, BURNIE (004) 31 7733
MITCHELL RADIO CO. - 59 ALBION ROAD, ALBION (07) 57 5830
S.A. & N.T. INTERNATIONAL COMMUNICATIONS SYSTEMS PTY. LTD. - 8 NILE STREET, PORT ADELAIDE (08) 47 3688
W.A. WILLIS ELECTRONICS - 165 ALBANY HIGHWAY, VICTORIA PARK (09) 470 1118
BAY RADIO - 22 GRACE STREET, FERNDALE (09) 451 3561
FORD ELECTRONICS - 209 HANCOCK STREET, DOUBLE VIEW (09) 446 4745

VHF UHF — an expanding world

Eric Jamieson VK5LP
1 Quinns Road, Forreston, SA. 5233

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50 010	JA2IGY	*Mie*
50 060	KH6EQN	*Honolulu*
50 075	VS6SIX	*Hong Kong*
50 109	JD1YAA	*Minami Tori-shima*
52 013	P29BPL	*Lokoata Island*
52 020	FK8AB	*Noumea*
52 100	ZK2SIX	*Niue*
52 200	VK8VF	*Darwin*
52 250	ZL2VHM	*Manawatu*
52 310	ZL3MHF	*Hornby*
52 320	VK6RTT	*Wickham*
52 325	VK2RHV	*Newcastle*
52 345	VK4ABP	*Longreach*
52 350	VK6RTU	*Kalgoorlie*
52 370	VK7RST	*Hobart*
52 406	VK0MA	*Mawson*
52 420	VK2RSY	*Sydney*
52 425	VK2RGB	*Gunnedah*
52 435	VK3RMV	*Hamilton*
52 440	VK4RTL	*Townsville*
52 450	VK5VF	*Mount Lofty*
52 460	VK6RPH	*Perth*
52 465	VK6RTW	*Albany*
52 470	VK7RNT	*Launceston*
52 485	VK8RAS	*Alice Springs*
144 019	VK6RBS	*Busselton*
144 400	VK4RTT	*Mount Mowbullan*
144 410	VK1RCC	*Canberra*
144 420	VK2RSY	*Sydney*
144 430	VK3RTG	*Glen Waverley*
144 465	VK6RTW	*Albany*
144 470	VK7RMC	*Launceston*
144 480	VK8VF	*Darwin*
144 485	VK8RAS	*Alice Springs*
144 550	VK5RSE	*Mount Gambier*
144 565	VK6RPB	*Port Hedland*
144 600	VK6RTT	*Wickham*
144 800	VK5VF	*Mount Lofty*
144 950	VK2RCW	*Sydney*
145 000	VK6RPH	*Perth*
432 057	VK6RBS	*Busselton*
432 160	VK6RPR	*Nedlands*
432 410	VK6RTT	*Wickham*
432 420	VK2RSY	*Sydney*
432 440	VK4RBB	*Brisbane*
432 445	VK4RIK	*Cairns*
432 450	VK3RAI	*MacLeod*
432 535	VK3RMB	*Mount Bunnyong*
432 540	VK4RAR	*Rockhampton*
1296 171	VK6RBS	*Busselton*
1296 420	VK2RSY	*Sydney*
1296 480	VK6RPR	*Nedlands*
10300 000	VK6RVF	*Roleystone*

EX-MACQUARIE ISLAND

Sojo VK7ZSJ (ex-VK0SJ), has written to put matters right in regard to possible future six metre operations from Macquarie Island. It appears Doug VK0DS, now at Macquarie, has no keyer on his six metre rig so VK0DS, as a beacon, has been removed from the list. In addition, Doug does not monitor the six metre receiver in his work area as Sojo did last year, hence he will only make the odd contact on six metres when he is in the shack. So it appears the degree of activity from that island will be spasmodic. The original keyer has been returned to its rightful VK3 owner through co-ordinator, Gil VK3AUI.

Although Gil has the full list, Sojo included a resume of his VHF activity from Macquarie last year. He worked separate call signs in the following call areas.

VK1 — 2; VK2 — 15, VK3 — 72; VK4 — 13; VK5 — 11, VK6 — 3; VK7 — 26; VK8 — 5, ZL2 — 7; ZL3 — 9, ZL4 — 2.

He said the number of QSOs is easily double these figures, plus the first 10 contacts to VK3 on 144 MHz.

Thank you for writing Sojo. I think the VHF fraternity owe you and David VK0CK a big thank you for the degree of dedication given to VHF operation during the past three years. There have been others previously who provided a small number of contacts to VK stations, but the efforts of you two people have provided hundreds of operators with a VK0 contact. We must also thank those operators in VK3 (such as Gil VK3AUI and Lionel VK3NIM) who provided the backup facilities when needed. The VHF fraternity says well done and thanks!

ACROSS THE EQUATOR

Peter VK8ZLX, has kept me informed of good conditions prevailing during the equinoxial period with contacts between Alice Springs and Japan on 50 MHz. The first openings appear to have started on 19/3 with two JAs worked around 0654, then on 20/3 10 JAs around 0705. On 28/3, further JAs on 50.110 from 0530. On all occasions, in response to Peter's phone messages, I checked both 50 and 52 MHz, but no sign of any stations from Japan. We were too far south and needed some assistance from Es to make contacts possible.

A further message from Peter VK8ZLX, on 18/4 indicated a big opening to Japan on 50.110 or thereabouts, with a whole log page of contacts to districts 1, 2, 3, 4, 6, and 0. Contacts started in the late afternoon and continued into the evening local time. Peter also said KG6DX, at Guam, was working into Japan as he could hear the JAs calling him but found no sign of the Guam station in Alice Springs. The JAs were also calling HL9. In addition to Peter, others involved in Alice Springs were Jeff VK8GF and Mike VK8ZMA.

On 9/4, VK8 stations also had contacts to VK6KXW in Perth and to VK2 stations. So it looks as though sitting in the middle of Australia has some compensations!

DXPEDITIONS TO THE PACIFIC

My apologies to Nev VK4ZNC, for mislaying his letter sent in January 1987 — it came to light a week ago. The information it contains is still relevant and of interest.

"After my recent expeditions to Niue ZK2, West Samoa 5W1 and Fiji 3D2, on six metres, I thought readers may be interested in activity from these places.

"On the way to Niue Island, I had to stay overnight in Auckland, where I was met at the airport by Cliff ZL1MQ. He put me up for the night after taking me around to meet Bob ZL3NE. Cliff has some 40 odd countries up on six metres, his score being pushed up by lots of countries from the Caribbean area.

"On arrival in Niue, I found the hotel was the only place to stay at $70 a day plus meals. From here, with a 10 W TR-9300 transceiver running into a home-brew 70W power amplifier and a five element Yagi at 15 feet (4 metres), I was able to contact 32 stations in VK and ZL during my two weeks stay. Stations worked: ZLs — 21, VK4 — 4, VK2 — 5; VK3 — 1, ZK2 — 1. On Niue I met most of the active amateurs on HF, these being Robert Douglas ZK2RD, who can operate on six metres from the radio station where he works or from his home. Father Philip Turner ZK2PK, from the Catholic Mission, who would be interested in coming on six metres if somebody supplied him with some equipment. Sione Tiakia ZK2ST, the local RI man, who handles radio licensing. He is not active at the present time.

"From Niue I flew on to American Samoa, where I spent only two days. The town of Pago-Pago is surrounded by very high mountains making it difficult to get a clear take-off in any direction. Also, the mains voltage is 110 volts, which rendered my power supply useless. I was informed by one chap at the communications office, that he knew of only one active amateur on the island and he was in the States at the time. I suspect this amateur would have been AH8A, a station contacted in peak years of the sunspot cycle by many VKs on six metres. On the strength of all this, I moved on to West Samoa, only 90 miles (128 km) away by air. By the way in both the Samoa's they drive on the right-hand side of the road.

"On arrival in Apia, I found, as in Niue, that a licence was very easy to obtain over the counter by just showing your VK licence and paying the required fee. Here and in Niue a "Z" call or a novice will be given a full call and allowed to operate on all bands. The maximum power allowed in 5W1 is one kilowatt.

"As 5W1GA, I managed to contact 32 stations from Apia. These comprised ZLs — 19, VK3 — 5, VK2 — 4; and VK4 — 4. Before I managed to get the beam up I did hear VK4ZJB at 5x6 and VK2XJ, at 5x3 on a temporary indoor ground plane antenna, but did not have the power to get back to them. In Apia I met most of the active HF operators and these were: Bill , Mary and Stewart Francis. Bill 5W1FT, his wife, Mary 5W1FM and Stewart 5W1FZ, their son, are all active on HF. Percy Rivers 5W1AB and Richard Tenney 5W1FV are also active. Phil Williams 5W1AU, is also active on HF and has six metre equipment. Since he shifted house recently, he has not bothered to put his six metre beam up again. So, at the moment, no one is operational on six metres and no one is very interested in coming on in the near future. After two weeks in West Samoa, I moved on to my last port of call — Fiji.

"Upon arrival at Nadi airport my equipment was confiscated by Customs. Without a prearranged licence, radio transceivers are not allowed into Fiji. After a four and a half hour bus trip to Suva, the capital, I managed to get a clearance the next day from the radio inspector, Josua Turagan valu 3D2JO, to release my equipment, but no licence. In Fiji you need to apply for a licence well in advance, by mail. So, with the permission of Jos and another amateur, Raj 3D2ER, a retired radio operator, I set up my equipment at Raj's place in Suva, after retrieving the equipment at Nadi — four and a half hours away by bus again!

"Using Raj's call sign I contacted 105 stations in VK and ZL in only three and a half days before leaving for Brisbane on 22/12/1986. With very limited time in Suva I did not meet many other amateurs, but I was told the following station should be active: 3D2CC, 3D2DW, 3D2ER, 3D2ES, 3D2MR, 3D2PD and 3D2RM. Also, Dick Northcott 3D2CM, is active on HF and has six metre equipment. Unfortunately, I did not get to meet Dick as he was in Melbourne at the time of my visit. Greg 3D2MR, came to visit Raj a couple of times while I was operating, and showed much interest in the band and used my equipment for a while to work some stations. My equipment and antenna were left with Raj.

"In all the places I visited, there are very few white people, and mainly from their ranks come the radio amateurs. Almost no dark local people were amateurs. Why? When the locals are earning a typical wage of less than our dole no wonder they cannot afford to buy radio equipment. Nev Cooper VK4ZNC (ex-VK9LC, ZK2AZ, 5W1GA, 3D2ER)."

That's a very interesting letter Nev, and sorry it had to be so late. At least one can now understand why there is a rather low level of activity from these places. It would be hard enough to find spare cash for HF equipment let alone six metre equipment.

REPORT FROM ALBANY

Wally VK6WG, sends along some information of a quite different nature and probably not covered before in such detail. In response to a suggestion from Reg VK5QR, Wally has tabulated the many times the VK5VF two metre beacon has been heard in Albany during the six months to March 1987, also information on openings on the UHF and SHF bands as well. Bearing in mind that the distance is around 1910 km to the beacon on

Mount Lofty, and 1885 km to Reg VK5QR, at Enfield, an Adelaide suburb.

"28/9/86: 0210 UTC VK5VF in and out of noise through to 1230. Made many calls but no answers. 2/11: 2215 heard VK3 repeater, VK5VF very strong, tried to raise VK5QR but no QSOs. 19/11: VK5VF heard at 2130 and still audible at 2200. 22/12: heard VK5VF 0955. 26/12: 0955 heard fairly well but faint at 0135.

"3/1/87: Heard VK5VF at 0630, again at 0200 weak and still audible 0815 then again 0900 to 1030. Worked several VK5 stations on 144. Tests made with VK5QR on 432 were good on peaks, signals faded out by 1400. 4/1: Beacon heard and worked VK5QR on 432 at 1135 and faded out by 1147. At 1200 worked VK5NY on 432, signals gone by 1330. 5/1: Beacon in 2245. Worked VK5NY 0032 on 144. At 0100 signals gone. 7/1: 0740 heard VK5VF, at 0805 on 144 worked VK5NY, VK5VBT, and VK5NY on 432. Signals 5x5 and 3x2. 14/1: 0030 VK5VF, faded out 0400. 18/1: VK6KJ reported hearing beacon at 2340. 4/2: VK5VF 0100 very weak, still weak at 0330 then strong to 1030 and very steady. Tried to raise VK5s but none heard. 8/2: VK5VF at 0320.

"11/2: VK5VF at 0648 and came stronger at 0830 and still in at 1300. At 1325 worked Reg VK5QR, on 432. 1296 was just discernible by Reg, at 1400 much stronger and good signals relayed back by Reg. Closed down at 1435. 15/2: VK5VF 0730 fair strength then weakened; in again at 0745 and out at 0900.

"2/3: VK5VF 0805 and still in at 0845. 11/3: VK5VF 2300 to 2330. 13/3: VK5VF 0245 and still there at 0355. On 22/3 VK5VF at 2320 was steady and strong. Made several calls on 144.100 as did VK6XV but no replies. Beacon again audible 0625, again at 0700 and still there 0800. Then worked VK5ZMK, VK5NY, VK5ZPS on 144 and VK5NY on 432. At 1150 caught up with VK5QR and 1296, 2304 and 3456 MHz were all found to be usable. This is the second time all bands usable up to 3456 MHz has been noted this year. The previous occasion was 8/2/87 when 3456 was usable for about four hours continuously with fast QSB. The last opening on 22/3 was only available for a short time."

Wally VK6WG, hopes that this report of the continuing availability of a path across the Great Australian Bight on many bands will generate an increased interest by operators, particularly in the Adelaide area where they are uniquely situated to make good use of the path to Albany, and so make use of the higher frequency bands which are available to them.

At present both VK5QR and VK6WG have working 5760 MHz receivers and very low transmitter power, and both have heard their own signals up to 16 km, and of course, are looking for the day when conditions are suitable to produce a contact on that band between them.

Wally also says, one day when he has time(!) he will compile a list of his findings as to when the UHF and SHF bands come good for use. This will require going back to about 1948 when his records start. In the meantime, both operators get much joy from investigating and making parts for the GHz bands. Good luck to you both and may you be joined by some others before too long.

THE ROSS HULL CONTEST

I had hoped by now to have been given enough ideas by the VHF fraternity to put something quite positive on paper regarding the future of the Ross Hull Contest. There has been very little response to my continuing requests for your thoughts. The latest letter to hand is from my good friend, Gordon McDonald VK2ZAB, who is an operator with a very keen VHF interest and been in the forefront of pioneering contacts using aircraft to enhance signals. His thoughts need to be given attention and I quote from his letter as follows:

"This letter is in response to your request for readers views on the Ross Hull Contest as spelled out in AR for March 1987.

"I have already spelled out my views in a letter to the Contest Manager some months ago, and, looking back on that, the lack of response from that gentleman indicates that perhaps I should have sent it to you. I recall sending you a copy for reference; perhaps it should have gone to you for direct action. However, it won't hurt for me to go over some of my views again, so here goes.

"*Contest . . as defined by the Macquarie Australian Dictionary* is 'striving for victory or superiority.'

"Therefore, in order for any endeavour to qualify as a contest it must engender in the participants a feeling that success in that endeavour will put them in a position of superiority and/or that they will be victorious over the others.

"The Ross Hull does not do this for me and I assume it does not do it for others either. I do not feel the urge to strive for victory or superiority in the Ross Hull simply because the current rules emphasise the requirement to be there above all else. In other words, the mere act of being there can put you in the position to win. This is not enough.

"Anyone who has seen the Peter Sellers film 'Being There' will know than an endeavour which relies on the being there factor is a joke — ludicrous!

"Put in another way, the Ross Hull as it stands is a contest for the 'quiche eaters' not 'real men'.

"The reason why the Ross Hull is seen to rely too heavily on the being there factor is that it depends too much on points gained through contacts made due to anomalous propagation conditions. In other words, we give kudos through the allocation of points to that person who, for whatever reason, happens to 'be there'.

"To be successful, the Ross Hull must be changed so that it gives kudos through the allocation of points to the person who has skill — skill at the building and operation of an amateur radio station.

"The only way to do that as I see it is to cut out, as much as possible, the anomalous propagation factor. This means holding the competition at that time of the year when these conditions are least likely to be obtained; ie plus or minus six weeks from mid-winter.

"Of course, the Ross Hull is too long as it is now but that seems to follow from the emphasis on anomalous propagation; ie it is long to try and spread the chance at getting anomalous propagation over a wider area. If it is held at plus or minus six weeks of mid-winter there would be no need to do that and it could occupy one weekend only — a much more reasonable period all round and one which further reduces the being there factor.

"Incidentally, I am writing this during the John Moyle Field Day Weekend Contest and I must say that even that seems to be too long because, although there was a great deal of activity on two metres and 70 cm early in the contest — more activity than I have seen for many years in fact, as I have worked some 34 stations on two metres SSB including three VK4s and eight VK3s up to now (4 pm Sunday), but at this time there is virtually no activity here. It all seems to stop about lunchtime — roughly 24 hours after it started, so it seems like putting the extra bit on the end and allowing people to choose their own 24 hour bit wasn't worthwhile — in fact, why do it at all? Is this another attempt to cover anomalous propagation?

"Twenty four hours is enough — no more, no less. The Ross Hull (and John Moyle) should be 24 hour competition and that's that!"

Thank you Gordon for that contribution. Your thoughts are quite different from any others which have so far surfaced and should be capable of causing some comment and I will be the first to say something.

But first, let me refer to the results of the Ross Hull Contest as published in April AR. Congratulation to Les Jenkins VK3ZBJ, who once again has come out winner of the contest in the seven day section, and to David Tanner VK3AUU, for winning the two day section. Of the 19 logs submitted there was none from VK1, VK6 or VK7.

One can understand the disappointment and frustration of the FCM with such a small log entry, and I feel disappointed too that more did not enter in an effort to try and keep the contest alive while we further attempt to sort out something which will be approved by more people. I am aware of a virtual boycott from VK6 and VK7, but I do not think this really helps the cause. VK7 will have the Contest Manager in their State for the next three years. If the Contest is still going will they treat their Manager in the same way?

In line with the theories expounded by Gordon above, it could be said VK3ZBJ won because he "was there." Certainly Les put in a lot of time operating and, whilst some would say he was fortunate to have the time to do so, I am not sure this is a fair comment, as one still needs to be dedicated enough to spend so many hours at the operating desk. Another point which did please me about Les was the fact that, despite the removal from the contest of all bands above 70 cm, he still entered and proved under the existing conditions it was still possible to win with three bands instead of the six or so which he normally operated. I am only sorry some of the others with an equal number of bands did not see the contest in the same light and give it a go!

I have also been informed that, in many cases, those with capabilities to operate on 1296, 2304, 3456, etc have moved into these regions with the idea of having contacts in the Ross Hull Contest II, as a result of their non- participation at the moment, the Ross Hull is removed from the Contest Calendar, what has been achieved? I have stated previously that somehow the UHF and SHF bands should be included in the Ross Hull but for this year we should try a three band contest whilst we look at the higher band position. I am not entirely convinced that bands up to 3456 MHz and perhaps higher, are solely attempted because of the Ross Hull, although this may be a contributing factor. Reg VK5QR, and Wally VK6WG, who have done so much to pioneer work on those SHF bands, I am sure, never had the Ross Hull in mind! I too would like to move into those areas before too long and because of my location, all such activity will have to be from portable locations, but I don't have operation in the Ross Hull on those bands in my mind at all. I believe any operating I do in that contest should be on bands where the majority of operators are located and so provide me with the maximum of competition.

On the subject of the timing of the Ross Hull as suggested by Gordon VK2ZAB, whilst the idea of a mid-winter contest has some merit, I don't believe it will be universally supported because it will be far too restrictive for the following reasons:

1. Generally it will favour those operators who live on elevated sites; eg VK2ZAB, VK5NY, VK5CK, and others.
2. In the event of no enhancement of propagation as Gordon would hope for, those living in the metropolitan areas of capital cities will have distinct advantages over those living elsewhere by reason of amateur station density alone.
3. Those living close to the southern seaboard areas, eg Adelaide to Albany path, etc, could have advantages in the event of some enhancement over those not so favourably placed.
4. A simple 24 hour contest will not give any incentive to operators to go out portable to try and match locations like those of Gordon's due to the logistics of putting everything together for say three bands for such a short period. I know what I am saying in this regard because I have gone out portable on many occasions, but I do like to be out for more than 24 hours when I make the effort!

In looking at No 2 above, how fairly would, say Peter VK8ZLX in Alice Springs, see the contest. Maybe in 24 hours he could work five stations on each band (52, 144 and 432), while Les VK3ZBJ, in the same time could work perhaps 200 or more stations if he really got into it! As a mid-winter effort, I see the contest becoming a metropolitan area only contest.

Although it would not fit Gordon's non-enhancement criteria, a contest held over a weekend, say after Christmas, eg this year it could be Saturday and Sunday, December 26 and 27 for a weekend or one of those days for a 24 hour contest, it would give those living in areas away from cities and not normally favourably placed some chance to achieve a reasonable ratio of contacts due to the generally more favourable propagation conditions existing at that time. I really don't believe we can expect a successful VHF contest on an Australia-wide basis to be successful unless it is held during the normal Es period.

If it will mean the continuation of the Ross Hull Contest for the time being, I have no real objections to a 48 hour contest (not 24 hours) over

a two day UTC period between Christmas Day and New Year on 52, 144 and 432 MHz for one part, and for bands 1296 MHz and above for a second part of the contest. An overall trophy for the best score on the first three bands, another for 1296 and above. Certificates could be issued for best performance Australia wide on 52, 144 and 432, and if thought to be giving further incentive, certificates for best performance on those bands on a State basis. If successful it may be possible to have a Ross Hull Contest based on a State by State scoring as for the Remembrance Day Contest, with the highest scoring State being the overall winner. There are lots of possibilities in a shortened contest and this is something the new Contest Committee or FCM could look at during the next three years. The important thing is to keep the contest going and the help of everyone is needed to ensure that it is kept going, and no more boycotts please!

As the result of all the above, you may now feel compelled to put pen to paper and come up with some constructive suggestions which will be so much better than the considerable amount of destructive criticism heard on the bands this year!

OVERSEAS

From April 1987 *World Above 50 MHz* in *QST*, Bill Tynan W3XO gives a list of the Microwave Standings as seen from the USA. On the new 33 cm (902 MHz) band longest distance worked is 478 miles (miles are still used in the US) by W2PGC, on 23 cm N6CA and KH6HME with 2472 miles, on 13 cm KD5RO and W8YIO with 940 miles; 9 cm WB5LUA/5 and WB5AFY with 265 miles. These are terrestrial distances and not EME.

By now the Northern Hemisphere stations will be getting into their summer Es period and W3XO notes a number of European stations now have activity on six metres with the most stations in the UK but with restricted radiated power. Other European countries reportedly with some six metre activity include Norway with 25 permit holders, Ireland with at least two permit holders, Spain with some activity and also Portugal. Gibraltar still permits six metre operation and the ZB2VHF beacon has now been moved to "the top of the rock" and is generally refurbished. Bill does not have any information on how active ZB2BL or any other of Gibraltar's potential 50 MHz operators may be. On the Isle of Man there is GD0GBA who was originally EI9D and very active during the last sunspot peak from Ireland.

During the Northern Summer, following our 1985 Summer, with its outstanding two metre contacts, the northerners did not have a similar improvement on two metres. It will be interesting to see whether the 1987 Northern Summer will give a peak to two metres anywhere approaching the great coverage we had during our 1986 Summer. I expect Bill will keep me informed on this as time goes on. So far there seems little to indicate the two hemispheres follow one another closely when it comes to VHF propagation in general.

GENERAL NEWS

Not much to report from my QTH on six or two metres. One opening to VK2 on six metres recently and I am still off two metres while awaiting that rotator!

Angus VK2VC, has received confirmation of his contact with 3D2ER so confirmation is possible. Angus remarked he had heard Gary W6XJ was to be in VK during March/April and regretted not having worked him during the 1980s. I missed him too.

Doug VK3UM, has forwarded information on MS activity between Ross VK2DVZ and himself and this I will pass on to you in a later issue. There is also an interesting resume of the EME activity of the now defunct VK2AMW effort (due to destruction and theft of their equipment) in *The Propagator* which I think should be given wider publicity and this too will be used at a later date.

Closing with the thoughts for the month: *Definition of a brat: Somebody on their past behaviour* and *Nothing will be attempted if all possible objections must first be overcome.*

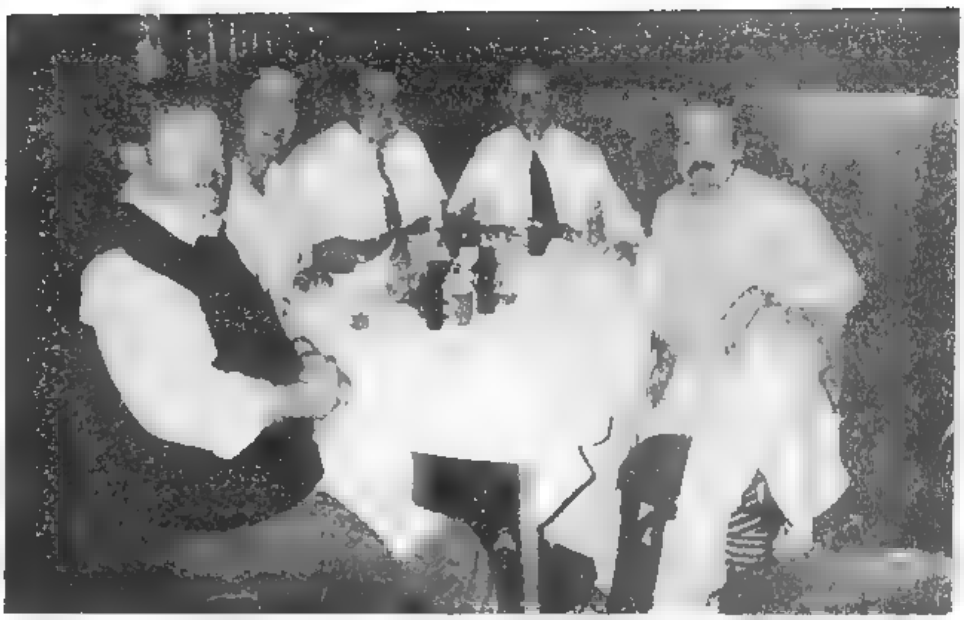
OVERSEAS VISITOR from Gil VK3AUI

Gary W6XJ, provided many of the contacts across the Pacific on six metres during the Sunspot Maxima.

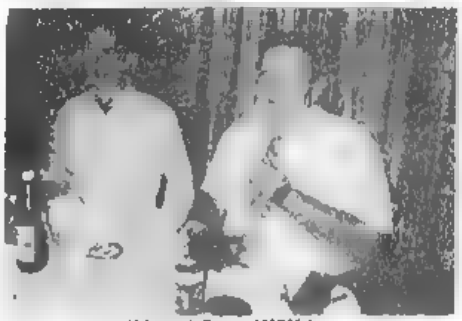
During a recent overnight stop in Melbourne, Gary went out to dinner with some Melbourne six metre operators. Many tales of contacts and near-contacts were told.

Gary and his wife Jan visited Australia on their Pacific area honeymoon trip. They visited Tahiti, the Cook Islands, New Zealand and Australia.

In Australia Gary met amateurs in Tasmania, Melbourne and Sydney.



From left: Rob VK3XQ, Lionel VK3NM, Gary W6XJ, Gil VK3AUI and Mike VK3BDL enjoying a meeting with Gary during his visit to VK.



Lionel VK3NM and Gary W6XJ.
—73 The Voice in the Hills.

Contests

Ian Hunt VK5QX
FEDERAL CONTEST MANAGER
Box 1234, GPO, Adelaide, SA. 5001

CONTEST CALENDAR

JUNE

6 YLRL Novice/Tech Day
13 — 14 South America CW Contest
20 — 21 VK Novice Contest
20 — 21 SMIRK (6m) QSO Party
27 — 28 ARRL Field Day

JULY

1 Canada Day Contest
11 — 12 IARU World Championship
18 — 19 CQ WW WPX VHF Contest

AUGUST

15 — 16 Remembrance Day Contest
15 — 16 New Zealand Memorial Day Contest

SEPTEMBER

26 — 27 CQ WW RTTY Contest

By now you will, I hope, be gearing up for the VK Novice Contest. I would encourage as many as possible of you to support this contest. Also what about the Full Call operators doing their best to help the Novice operators by providing them with contacts in this contest and also encouraging as many of the Novice operators to come up on CW. It might also be a good chance for some of the Full Call operators to brush up on their CW capability. In this contest you need not be embarrassed because there is a speed limit set for CW operation and you can pretend that you are only operating at slow speed so as to help the others. (No one else need even know the real truth). See rules for the VK Novice Contest in last month's issue.

The next major contest on the Australian Calendar is the annual Remembrance Day Contest. Once again, a big entry is expected and it will be interesting to see whether the trophy will change hands again. The rules will appear in the July issue and will be pretty well unchanged from the 1986 Contest.

At the same time as the Australian Remembrance Day Contest is being conducted I expect that the New Zealand Memorial Day Contest will be run. Having both these contests coincide is fitting, particularly as they both represent a tribute to those members of our fraternity who gave their lives in the service of both the countries concerned.

I would hope that the number of ZL stations participating in our Remembrance Day Contest might increase as a result of the approach taken. It has been agreed between myself and the ZL Contest Manager, Jock White ZL2GX, that contacts made in either contest will be accepted as being valid for both, ie VK stations may work ZL station and count the contacts towards the Remembrance Day Contest. You may then also use the contacts made with ZL station as an entry in the ZL Memorial Day Contest. I do not yet have a copy of the rules for the ZL contest, but, if my memory serves me correctly, that contest is run only on the 80 metre band is of limited duration.

So look carefully at the content of next month's issue for more details.

YLRL NOVICE/TECH DAY

I have included information on this one solely as an example of a contest which has been implemented for a Special Purpose and with a restricted entry. It may be of some interest for you to see something done this way. Details are as follows:

This is a new one organised by the YLRL to promote activity for the YL Novice and Technicians. Operation will be for YLs on CW only.

TIME: 1700 to 2100 UTC Saturday, June 6.

EXCHANGE: Station worked, RST, Name. QTH and class of licence.

SCORING: Three points for each YL Novice/Tech worked. Two points for YL General or Advanced Class and one point for YL Extra Class. The same station may be worked on each band for credit. Score each band separately. The sum of your score on each band is your final score.

FREQUENCIES: 3.730, 7.130, 21.130 and 28.130 MHz ± 10 kHz. Maximum power of 200 watts.

AWARDS: YLRL postcards to the top scoring Novice/Tech and General Class or higher YL. Submit original log only, which must be signed by the station operator. Include a summary sheet showing the scoring and other essential information, including your licence class and address. All entries must be received by July 3 and go to: Mary Lou Brown NM7N, 504 Channel View Drive, Anacortes, WA 98221, USA.

From time to time, details of a number of rather obscure contests come into my hands, however I generally do not include them in my notes as they would be of little interest. Suffice to say that it appears that contests can be run by any group of operators, no matter how small and for virtually any purpose, mode, time or any reason that can be dreamed up.

ADELAIDE HILLS AMATEUR RADIO SOCIETY "NATIONAL SPRINTS"

It would certainly seem that the first of these events was most successful. I have been advised that the AHARS intends to run the next of two of these short and sharp competitions on July 11 for CW and July 18 for phone.

The rules for the events will be almost the same as previously. Times of operations will be similar but the total operating period will be reduced. These "Sprints" will be restricted to the VK/ZL and P2 call areas. So, here is a chance to test out both your equipment and yourself in readiness for the Remembrance Day Contest to follow.

My personal opinion is that the sprints are a great idea. I hope that you will back my judgment on this by providing plenty of support for them. One particular advantage is that they do not require a commitment of a great deal of time for you to be a full participant. Rules for the coming round of sprints will be provided separately by the AHARS for publication.

JOHN MOYLE MEMORIAL FIELD DAY CONTEST

Logs have been steadily coming in for this contest and, as I write this, there would appear that this contest has again been a success. The section for stations operating from home with emergency power seems to be becoming popular. A certain amount of comment has been received regarding bias towards VHF operation. I can assure you that this has not been intended, however I accept that this is the case.

I do not intend to go into detail as to how this situation occurred, at least not at this stage, however I will merely comment that the basis for this effect has been mainly historic.

My report for the coming annual Federal Convention soon to be held in Melbourne has been submitted. (These notes are being written in mid-April). Should the Federal Council see fit to accept my report and adopt the recommendations contained therein, you will see some changes to rules for contests in the future. I would hope that these changes will again see an improvement in contest matters here, within VK.

Amongst the correspondence already received, in connection with the Field Day, was a letter and description provided by Judy VK5BYL, as to the various adventures encountered by the operators of VK5BAD in this contest. It makes most interesting reading and was accompanied by photographs as well. I thank Judy for her help in providing this material.

"OUR FIELD DAY WEEKEND

"Now, have we got everything ready for the weekend? Just check the list. Rigs, Antennas, Coax, Patch Cords, SWR Meter, Pen, Paper, Log Sheets, AR with the Rules, Food Drink, etc, etc."

The VK5BAD Operating Site.

"Looks like we're going for a fortnight, not just the weekend!"

"Dale and Trevor will be around at 8 in the morning and Graham and Joan will meet us there at 10."

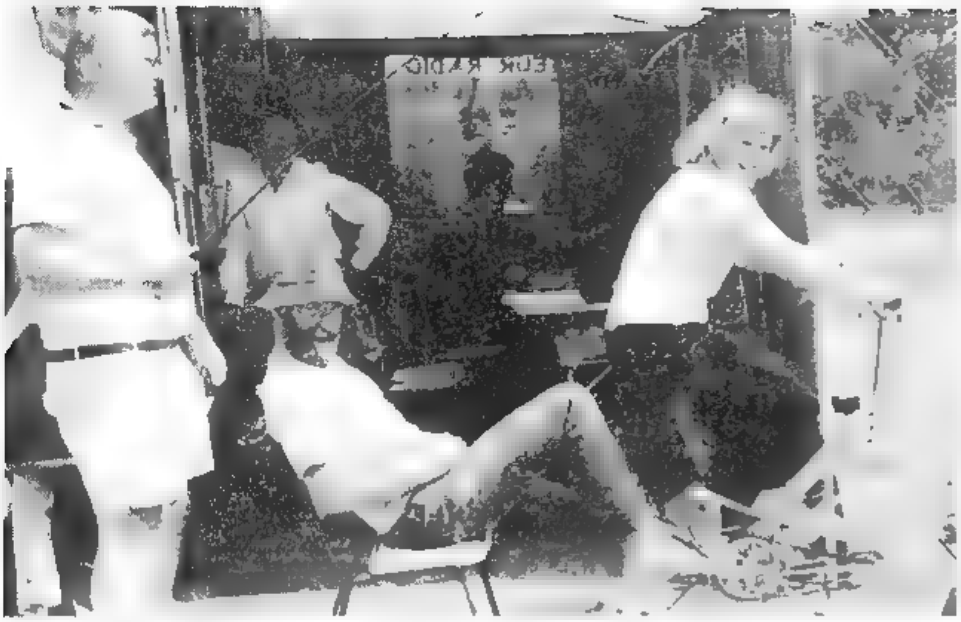
"Glad we've got a new 'operating' table this year. The other one is just slightly the worse for wear, although it has done good service for the past three contests. The trailer's loaded up and the 'shack' is hooked on so we should have no problems getting off in the morning."

Saturday, March 14, and perfect weather for the John Moyle Field Day Weekend.

As planned we all arrived at the site eager to set up camp. Many hands help to get the van in place, erect the annex and install the radio shack with all its bits and pieces. "Oh, no! Where's the lead for the power supply! The only thing we've forgotten."

Within a few minutes Trevor saved the situation and, with a little ingenuity, made up a plug to fit.

Time now to sort out all that coaxial cable, dipoles, beams and guy ropes which were carefully packed in the box. At least they were



Operating VK5BAD, Judy VK5BYL and Trevor VK5ATR pedalling, Graham VK5AT using the whip, Joan VK5AVJ watches bemused whilst Dale VK5BGR concentrates on the operating.

carefully packed when we left home. Guess the rough road didn't help a lot!

We all helped pull the extendable pole out to its full length, which would be our tower, and attached the beams, dipoles and guys, then supported it all on the ladder we had brought. Now for all the coax and to remember which coax goes to what antenna.

"Looks like it's already to go up. Each grab a rope and we'll get this up in no time."

CRASH!!! Oh no! Who tripped, yanked the coax and made the whole array fall off the ladder and onto the ground. What a site/sight!

We hardly dared look — bent beams, broken insulators and everything else very "skew-whiff."

Quick, out with the sticky tape, pliers, spanners and good amateur spirits to get it all together again.

"Okay, let's try again. Heave Ho! Up she goes. Just as well there's no strong wind today."

"Looks good."

With the tower not securely tied down (up) and the generator eagerly purring away it's time to check out the SWRs and power levels — all vital to a good amateur shack (even though it's out in the bush).

"Hey, look at this. The 70 cm beam just won't load up. Must have done something to it when it fell. Can't do anything about it now. It's the one right on top too!"

"Pens, paper, log sheets, rules and "instant paper" close at hand. We all agreed we were ready to start but not before a well earned cup of coffee.

"Okay, we're in it for 24 hours and here we go!"

"CQ, CQ. John Moyle Field Day Contest. This is VK5BAD-portable calling."

The rest of the day slipped by rather quickly and the "shack" worked really well.

We all took our turn on the radios and all enjoyed our rostered canteen work too! In between, we eagerly awaited our turn on the "natural power source" we had "invented."

An exercise bike connected to an alternator, connected to a battery via an amp meter.

Phew! It was uphill pedaling all the way but it worked.

We found that pedalling tandem was just a little easier and could sustain a more steady rate of charge for a longer time (with a little encouragement — whip, whip).

Full marks to Dale who sat up all the long, lonely night manning the station, adding greatly to the score. Just as well he had a kerosene lamp burning "just in case the generator ran out in the dark."

The silence was deafening, and, right in the middle of a contact, too!

Sunday morning dawned bright and beautiful. It was nice to wake to the sound of nature blending with (competing with?) the persistent sound of the generator still purring away.

Everything at the station worked well (for a field site) and it was nice to have a few interested visitors drop in and have a cuppa with us.

All too soon it was time to put out the last call from our field station for this year.

We all thoroughly enjoyed it again and you can be sure you will hear us next year calling "CQ, CQ, John Moyle Field Day Contest. This is . . ."

We look forward to meeting you on the air and exchanging signal reports and numbers. Till then, best 73 and take care.

Baylee VK5BAD
Judy VK5BYL
Joan VK5AVJ
Graham VK5AT
Dale VK5BGR
Trevor VK5ATR

Another keen operator, who also provides an interesting letter is Ken VK3AJU. This letter is worth quoting.

"Here it is . . . my first serious contest entry.

"I've given numbers to help the other bloke in several contests and I put in a log for the last Remembrance Day, but it represented only broken time in the shack, in between domestic chores and visitors.

"As you see, I did not eventually take the solar-wind route. The array of solar panels offered to me were about 300 km away and moving them, etc, was too big a job for a solo operator. I could not afford a wind generator and my workshop facilities — or lack of them — debarred me from trying to make one.

"Just as well — it was a breathless night, not a whisper of wind all through.

"That was a blessing, because my tent woomphs and flutters at a high audio level in a wind.

"Despite a lot of planning, a few things went wrong. Transport logistics for a start. I was still trimming wires for inverted Vees when the contest got under way. So my 24-hour entry represents a bit less, since transport logistics chopped off a bit of time at the other end too.

"However, the aim of the John Moyle Contest is to enable us to test our portable equipment and all things associated with it, and in doing so to improve it and our ability to use it.

"Long before Murphy enunciated his laws, Rabbie Burns noted that 'the best laid plans o' mice and men gang aft agley. .' Ideas and plans which look great when you sketch them out in the shack fall apart when you try them in practice. Seemingly trivial matters can become crucial when the real test is on. Is the hammer heavy enough to drive the star pickets for the guy wires into rock-hard ground? Is the generator noise tolerable 50 feet from the tent, or must you put it 200 yards away — or sink the thing in a pit?

"Two pullovers and an overcoat kept me warm — except my feet, which froze. I stepped out of the tent about 4 am and was staggered by the scene. It resembled a snowfield, but it was merely wall-to-wall heavy frost. With a backdrop of pine trees, it looked, by moonlight, like a scene from Canada.

"Some difficulties were of my own making. I should have had a decent light powered from the lead-acids instead of a dry cell torch. A wrist watch is far from ideal for time-keeping under torchlight. Checking back through the log to avoid duplicate contacts within three hours was very difficult. Often I had to rely on the other fellow to do the checking. My only battery-operated 24-hour clock has a dial 12 inches in diameter, and you can't hang that on a tent wall.

"I was a miser with power, rarely operating at full throttle. (Surely conserving power is part of the art of portable operating?) However, I perhaps overdid it, particularly with regard to light on the table. I never called on my third battery and the one I put on recharge was not called into service again. So I could have gone into action without the generator — not that I ever would.

"Despite all these minor problems, all of which can be overcome, it was a great experience. In fact, I'm seriously thinking of using the same QTH when the VK/ZL/O Contest comes around. The main reason is that it would give me an opportunity to run antennas which I can't accommodate at home — inverted Vees for 80 and 160 metres, for example, and even — hold your breath — a three-element beam for 20 metres. The portable QTH, should it be available again, even rouses visions of a Beverage.

"As you'll see from the formal entry material, it was an abandoned airstrip in the middle of a pine plantation near Kinglake West. Lots of clear space.

"You are welcome to include any of the above in entrants' comments on the contest, and perhaps particularly the following.

"It was a friendly contest, with hardly a cross word heard. It was also a fascinating total immersion in amateur operations for more than 20 hours, something I've never been able to do before — no telephone calls, no dogs to feed, no interruptions.

"At one stage, I contemplated operating from one of the "high places" in Gippsland, eg Mount Baw Baw, and in anticipation of curious tourists, visitors, etc, I prepared the accompanying "What are we doing here?" handout. As it turned out, I didn't need it in my splendid isolation on Mount Robertson. However, experience working portable in National Parks — particularly with high visibility in parking areas — suggests something along these lines can be useful.

"VK3BSM and others in the Gippsland area were very helpful in advising about possible QTHs in their area, incidentally.

"Cheers, 73, see you in the Novice Contest.

"Ken VK3AJU."

In Ken's letter he mentions a "handout" which he prepared in anticipation of inquisitive visitors to his Field Day Site. I have also reproduced this here as I feel that it is an excellent approach which many of you may well wish to adopt. I appreciate the efforts which Ken has made and I trust that this contribution may be used as a suitable example which can be followed by those wishing to do so.

"WHAT ARE WE DOING HERE?

"We are taking part in an annual exercise to test amateur wireless equipment designed for use in emergency situations and to improve our skills in operating it.

"You may have seen the late Tony Hancock in his famous comedy sequence about wireless amateurs and know that we are called "hams".

"Many Australian amateurs are members of the Wireless Institute Civil Emergency Network (WICEN) which can be called upon by the

Victorian and Australian governments to help during bushfires, floods and other disasters which have disrupted normal means of communication.

"The first news of Darwin's destruction by a cyclone came from an amateur operator running his transmitter from a car battery. During the Ash Wednesday bushfires, amateur operators were called out to provide communications in areas where telephone and electricity services had been cut.

"Even in distant disasters, such as last year's Mexican earthquake and this year's hurricane in Vanuatu, Australian amateurs have been able to help. Through wireless contacts with fellow amateurs in the stricken areas they were able to receive messages about what types of aid were needed, and to pass messages from survivors to worried relatives in Australia.

'The station you see here is VK3AJU/P. "VK" means it is Australian, "3" indicates it is in Victoria, and the "P" at the end means it is working in portable style and not from its owner's home.

"It all arrived in a station wagon — including the 11 metre mast and several aerials and was assembled with in an hour (rather more I'm afraid).

"This weekend March 14-15, hundreds of similar stations are operating in Australia, New Zealand and the Pacific Islands. Like VK3AJU/P, they are testing their equipment in strange surroundings where there is no mains electricity or other amenities.

"We are testing our equipment in case it is ever needed in an emergency — and improving our skills in using it.

"To make things more interesting and keep us on our toes, the exercise is in the form of a competition. Stations receive points for the number of contacts made with other stations, the distances between them and other factors.

"We apologise for being unable to give you a more personal account of what we are doing here. If you are reading this on Sunday, we will have been at the microphone or Morse key for 24 hours continuously — and more like 30 hours if it happens to be Sunday afternoon. The exercise is a test of stamina and ability to concentrate, as well as of wireless equipment.

"When the contest ends at 6 pm Sunday, we'll be happy to show you more of our station and answer your questions.

After all, you wouldn't expect a marathon runner to pause in his race to talk to you about athletics, would you?

"KEN GOTT VK3AJU
"Wireless Institute Civil Emergency Network, Area 13."

There seems to be no lack of material from entrants this year regarding the Field Day and this I appreciate. I would like to quote now from another interesting contribution. This comes from Steve VK3YH.

Charge System used. 600 x 300 mm Solar Panel, 1 x 2 metre Foil Covered Plywood Solar Booster, 400 Amp-Hour Battery, 0-5 Amp Amp-Meter, and Multimeter to monitor voltage.

Blacksmith's Workshop. About 3 x 3 metres, circa 1920. Note the 30 metres-plus gum tree — ideal for antennas.

"My portable operation was carried out from a somewhat dilapidated blacksmith's workshop, circa 1920, located on my farm.

"My game plan was to use the borrowed FT7 powered by a small solar panel, and my FT101E powered by a 2.5 metre diameter wind generator, if the wind would blow. As calm conditions were forecast, I left the 101 at home.

The VK3YH Contest Shack.

"The 400 amp-hour battery was discharged somewhat, by turning on the tractor lights for several hours before removing the battery. It was hooked up to the solar panel early on Saturday morning and the initial charge rate was two amps. But after adding the solar reflector, a one by two metre piece of plywood covered with tinfoil, the charge rate went up to four amps. After 10 hours of charging, at the commencement of my operation, the charge rate was down to two amps and I assumed the battery was fully charged.

"Taking an average three amps charge for 10 hours I figured the battery owed me 30 amp-hours of solar power.

"The FT7 has a current drain of 0.4 amp-hour on receive and three amp-hour key down CW. Taking two amp-hour (probably double the SSB TX/RX average) from sundown 0830 UTC until I went off air at 1730 UTC, I would have used 18-20 amp-hours.

"Therefore, I felt it is valid to claim the station was solar powered for the total length of my operation, and to claim the 10 bonus points for all contacts. I hope this meets with your approval.

"My antennas consisted of a halfwave dipole for 80 metres supported at one end by a 100 foot plus gum tree and 40 feet at the other. This gave a broadside orientation to the north and south and a sloper effect to the west. The 40 metre halfwave dipole was similarly sited but slightly lower.

Unused Wind Generator — No Wind! It is about 2.5 metre diameter, 40 amp car alternator. Blades are cut from a 200 litre drum. The blade angle is adjustable at the hub.

Feedpoints for both were directly above the shed. The 20 metre antenna was a quarterwave ground plane made of wire and supported by the tree.

"The good location and orientation of the 80 and 40 metre antennas brought many compliments of a good signal and disbelief at 'only QRP with FT7'.

"General operation in the contest was of a high standard with everyone enjoying themselves. Main topic of discussion between 2 am and 4 am was the cold and its cures. I quit at 4.30 am for one-and-half hours sleep and then milked my cows. I had to stop an hour early at 4 pm to milk again.

"Next Year? ? ? Sunday night I swore I would only do six hours, but it seems like a lot of work to go to for only six hours. . .

"One for the suggestion box. How about giving single operators the option of separate logs for each band starting at 001, to help avoid some of the confusion of who worked who, when and on which band?" (Perhaps those could be looked at when rules for next years are being formulated — FCM)

Well, to my mind it seems that Steve certainly went to some trouble to ensure that his solar powered operation met both the letter and spirit of the rules. I also find it somehow "different" to take breaks from the contest to milk cows. Gum trees up to 100 feet in height are a great thing to have around. Has anyone any favourite stories as to how they get their antenna wires up over tree branches. (Personally I use a roll of nylon venetian blind cord with a very heavy diamond-shaped lead fishing sinker on the end.) I also make sure not to have the nylon cord run through my fingers as it whistles upwards. I have learned a lesson from experience here! —FCM)

I also thank Steve very much for the photographs which he has supplied. Without being too ruse Steve, just how many redback spiders did you have to risk carrying you away from with in the shed, or don't you suffer from such creatures in your area?

The solar panel reflector idea is great. I have done this using a sheet of aluminium as a reflector, however the aluminium foil looks to be much shinier and this is probably better.

So, there we can see just a little of what some of the operators in the Field Day are doing. I am sure that you all have many more stories out there, so why not send them in and let us all hear about your activities.

I would expect that I will have all the Field Day results collated and ready for publication for next

month's issue. I will include selections of comments from logs together with results as per the usual method.

HF CONTEST CHAMPIONSHIP — 1986 — Final Results

Following publication of the 1986 VK/ZL Contest Results, I am now able to bring you the results for the 1986 Contest Championship Phone and CW Competitions. Please note that * denotes Trophy Winner.

PHONE

CALL SIGN	FD	RD	NOV VK/ZL		TOTAL
VK1LF	0	8	10	10	28
VK1RH	0	1	9	0	10
VK3DOM	0	9	9	0	18
VK3YH	0	7	8	0	15
VK3ZI	0	8	5	0	13
VK5QX*	10	10	9	9	38
VK5SJ	10	0	10	10	30
VK5ATU	0	5	8	0	13
VK6ED	0	8	8	0	16
VK7NCP	0	7	10	0	17
VK7NAI	0	4	9	0	13
					CW
VK2DQP	0	5	9	0	14
VK2AZR	0	1	8	0	9
VK3CGG*	10	10	10	10	40
VK3XB	0	9	7	8	24
VK3KS	0	6	8	5	19
VK3NK	0	8	9	0	17
VK4BRZ	0	6	8	0	14
VK4VAT	0	4	10	0	14
VK5AGX	0	9	10	8	27
VK6AFW	0	10	10	0	20

I would like to draw your attention to the magnificent result produced by Gil VK3CGG (now VK3CQ and our Founding Brass Editor). He only commenced contesting in the last couple of years and has already obviously learned a lot. You will note that he has a clean sweep for the CW Trophy with the maximum number of points obtainable. Rather than repeat the method used to determine the points allocated, I would refer you to page 41 of the March 1987 issue where I provided an explanation as well as listing the points accumulated by entrants to that time.

I hope to hear soon from the Federal Office that progress has been made in production of the trophies and also that the smaller replica trophies have become available.

One thing has become most obvious regarding the Contest Champion Competition which is, that entrants who enter all the contests involved will always have a far better chance of scoring well. From the results it also becomes apparent that good points can be produced by going out into the field for the annual Field Day Contest. Personally I do not understand why so many more operators do not participate in this way as it is a simple thing to do as well as a way of having a lot of good fun. A really elaborate field station is not essential.

I would hope that interest in the Contest Champion Competition will increase and that there will be a much harder fight for places during this current year.

Well, that is all that I have for you this month. Next month I may publish some of the details of my report as submitted to the Federal Convention depending upon what sort of reception it had by the Federal Council.

—73, de Ian VK5QX

ar

RSGB LISTENER CONTEST 1987

The second RSGB Listener Contest held last year was given world-wide publicity. The response was very good and the RSGB is hoping for an even higher number of entrants for this year's event. It is open to all SWLs throughout the world with separate sections for British Isles and overseas entrants. Activity on the amateur bands could be increased as the IARU SSB/CW Contest is also held over the same weekend.

Object of the contest — to log as many stations in QSO as possible.

Date and times — 1400 UTC July 11, to 1400 UTC July 12, 1987.

Sections and bands —

a) SSB only

b) CW only

Only one section may be entered — mixed-mode entries will not be accepted. The 28, 21, 14, 7, 3.5 and 1.8 MHz bands may be used.

Scoring — For scoring purposes the station logged must be in QSO with another amateur station. It does not matter whether the station is taking part in a contest or not. CQ, QRZ or similar calls cannot be counted for scoring. One point to be claimed for each station heard on each band. A multiplier may be claimed for each different country heard on each band. In the case of the USA, Canada, Australia, New Zealand and Japan each call area prefix may be claimed as a separate multiplier, for example: W1, W2, VE2, VK5, VK6, and so on. All other countries will be determined by the ARRL Countries List.

The final score is made up by the addition of the points scored on all bands *multiplied* by the total number of multipliers claimed on all bands.

Logs — Logs should show in columns, time (UTC), call sign of station heard, call sign of station being worked, a RS/T report on *station heard* at SWL's QTH, multiplier (if any), points claimed. If both sides of a contact are heard, they may be claimed as separate stations, and the call signs are to appear in the *station heard* column. Each station heard can only appear *once* in the *station heard* column on each band. In the column for *station worked* a call sign must appear once in each three contacts unless it is a new multiplier for the receiving station.

Logs should be submitted with each band listed on separate sheets, 28 MHz on one sheet, 21 MHz on another and so on. A separate sheet listing all multipliers for each band should also be included.

Duplicate loggings for which points have been claimed will be penalised at 10 times the contact value.

Address for entries — R A Treacher BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England. Entrants should ensure their entries arrive no later than August 10, 1987.

Awards — Certificates will be awarded to the leading station in each country in the overseas section provided that station scores at least 50 percent of that section winner's score.

ar

Book Review

Allan Foxcroft VK3AE
11 Virginia Court, Caulfield, Vic. 3162

RADIO FREQUENCY INTERFERENCE HANDBOOK
Department of Communications

This handbook was first prepared and distributed for DOC staff and has now been produced as an AGPS document.

Its original objective was to assist DOC investigators to identify and clear radio frequency interference problems and as such, the handbook is primarily directed to the Broadcasting and Television Services.

The coverage of RFI sources is comprehensive and the numerous colour photographs of television interference patterns are of great value in identifying these sources. Likewise, the techniques for suppression in each case are covered well, but are, of course, restricted to the BC and TV Service. Such an approach is understandable, since DOC Policy for many years has been to concentrate RFI investigation resources to the BC and TV Service often excluding other problems which warrant attention — certainly from an amateur point of view!

Only when we get to the last chapter do we find recognition that another piece of domestic equipment — the humble AF amplifier, can suffer from RF sources! ! ! This was obviously "tacked on" to the previous six chapters for convenience rather than completeness and is a reprint of already existing DOC publications. Nevertheless, the specialised subject of immunity is covered reasonably well and should be of interest and value to amateurs confronted with this problem.

Some comfort can be derived, in a whimsical manner, from the fact that in Chapter 4 — Interference from RF Sources, the Amateur Service does not warrant a mention. I suppose this is consistent with DOC statistics for the year 1983-84, which show that only 3.7 percent of complaints of interference to radio reception and 3.5 percent of television interference complaints are attributable to amateurs. Nevertheless, a section on Citizen Band Radio covers techniques and filters which may be applied to minimise the effects of nearby transmitters, including amateurs.

Some of this material is a direct copy from amateur handbooks.

So, if you are looking for a broad coverage of common sources of RFI with accent on their impact on BC and TV, then this is a very worthwhile buy. For particularly amateur problems, you should adhere to the well-known ARRL or RSGB Handbooks.

Chapters and contents are as follows:

Chapter	Genera
1	
2	Domestic Appliances
3	Interference from Television Receivers
4	Interference from RF Sources
5	PLI
6	Propagation Characteristics
7	Interference to Audio Equipment

Available from the AGPS mail order services and AGPS bookshops for $9.95 (mailing cost included).

ar

How's DX?

Ken McLachlan VK3AH
Box 39, Moorooibark, Vic. 3138

Many years ago it was said that the pastime of amateur radio was a hobby that could be enjoyed by all, regardless of colour, creed, religious or political beliefs and whether one was a miner, farmer, housewife, king or queen. At the time it was stated as an example, but it has proved to be true over the years.

Our hobby has become the hobby of kings, queens, princes, prime ministers, senators, miners, the owner of the corner store and others who are all on an equal and generally no one is the wiser until that valued QSL card turns up via the bureau or d rect.

One of the more active amateurs of note apart from King Carlos of Spain, is King Hussein of Jordan, JY1. King Hussein, a brilliant scholar with his education being in Britain, as was his army training, had no option or any say in being declared the King of Jordan, an area torn by many fractions, at the age of 16, in 1953. This was due to his grandfather King Abdullah being horrifically assassinated and the rule being taken over by his son, King Talah, Hussein's father. Unfortunately King Talah, after a few months rule, was declared medically unfit to rule the nation and the responsibility fell to their present ruler, JY1.

Hussein, since that date, has had to make many decisions for his people, some popular and quite a lot not so popular and his life has been marked by tragedy. His wife Alia, an amateur operator, with other members of the royal household, some also being amateurs, were killed in a tragic helicopter accident that brought media headlines, worldwide.

In June 1978, Hussein married Lisa Halaby. Lisa, an American of Syrian and Swedish descent and an accomplished graduate in Architecture and Urban Planning (one of her assignments was a study of Sydney suburbia) from the prestigeous Princeton University, who was to become Queen Noor, and have the interest in our hobby of taking the call JY1NH. This call appears in the *International Call Book*, simply as JY1NH Noor Alhussein. Incidentally, the couple share the interests of other hobbies which include aviation and photography.

As previously stated, generally one does not know who is at the other end of the QSO and even when they receive the card, it is not always clear. Is this not what the hobby is about, no matter who or what, everyone is equal. In my opinion, this is why one can get so much enjoyment from meeting on air and talking to people from countries hailing from all continents over a weekend or even in one day. As amateurs our privilege of being able to converse, experiment and enjoy a hobby should not be allowed to be exploited and run as a business which a minority seem to want in the search of 'gold at the bottom of the rainbow' or 'get rich quick'. It is a relaxing hobby. Please let us keep it that way and encourage others to join the ranks of the hobby that has so much to offer. Remember, if every Australian amateur introduced the hobby to one other person, it would double the issued licences and if each WIA member joined a new member in one year, our membership would double. No one needs a calculator to work that one out.

Incidentally Mary Ann WA3HUP, a staunch WIA member, is the QSL Manager for JY1 and has visited and operated from Jordan as JY9AA. Another lady amateur who has operated from Amman under her Jordanian call of JY8CQ is Ruthanna WB3CQN, a lady who was very popular when she visited our shores a few years ago. Incidentally both ladies still hold their Jordanian calls.

MARION ISLAND

There appears, at the time of writing, that there is some confusion when George VE3FXT, is going to show up from the area and the extermination of the feral cats has been given as one excuse. A number of substantiated reports indicate the future of the island and if the rumblings are true, there will not be any problems with the cats or any other fauna for that matter. If you hear a ZS8, which is the new prefix for the island, get it in the log quick-smart.

The unintentional and unfortunate mistake of Lew ZS1SL, in operating ZS2MI on August 30-31, 1986 and his intention of QSLing with the card overprinted declaring it was not a valid operation and therefore not acceptable for DXCC was thwarted by the South African Radio League Council and all cards received are now being returned with an accompanying letter outlining the details.

PIRATES

Again a sub-heading unfortunately. If you hear a station signing 3B6, 3B7 or 3B9 they have no paperwork to substantiate the call, as at the present the hobby is not permitted from these areas. Reason and period unfortunately unknown.

Another very suspicious operator and call is Song P9LZ, which is assigned to the Democratic People's Republic of North Korea. In my opinion, it is not worth 'singing' about.

One cannot but mention two other calls such as XZ2A and the unlikely XY5OO. It is nearly as bad as putting F0OL in the log on the first day of April.

GUANTANAMO BAY

A reasonably difficult country to get in the log. There are one or two around the bands on SSB and CW. One is KG4SG, who frequents the very low end of 20 metres on of course, CW. He prefers cards via the bureau, which can create a problem if not enough VKs in one call area work him, as they may be held until it is practical to send a number of cards because of economics. My advice if it is a new country for you, send the card to the bureau, with an SAE and appropriate means to buy the return postage.

SOVEREIGN BASE QSLS

Due to the short tours of duty by some of the operators, getting the QSL is quite a problem. The *RSGB Newsletter* suggests to QSL via the Joint Signals Board, BFPO 53, London, England. (Please mark the operators call clearly on the envelope to avoid confusion in the office . . VK3AH).

QSLING GENERALLY

It is an age old problem, some operators QSL promptly, some not so promptly, some infrequently and some not at all. If I knew of an answer or a solution to the problem, I probably would not have time to be writing these notes because of running a mega billion dollar turnover per year Business Consultancy Practice.

As I am still typing them, I do not know the answer though I consider that at this QTH, we have been very lucky as we have no outstanding cards that are required for DXCC. This is attributed to the tenacity of my wife Bett and the diplomacy that she has used to get a 100 percent return. Small items such as an accurate card, a little note to a QSL Manager, correct number of IRCs for postage, some used stamps included as goodwill, correctly addressed envelope (both sides) which saves the recipient a considerable amount of time.

One amateur, Paulo I2UIY, worked a number of new countries for his DXCC in the *1986 CQ WW SSB Contest*. Paulo has sent two cards with IRCs to the following stations C50WCY, FO6NG, V47K and XE2PQ. No replies have been received, which has been a very frustrating and expensive exercise and it is believed to be quite a common occurrence and personal thinking is that it will further deteriorate due to the economics involved.

Paulo would appreciate if anyone who has contacted these stations has or has not received a card and he has come up with the following suggestion for those in similar situations from contest operators, in that if no cards are received within one year of the contest contact, that a petition be forwarded to the contest organisers to have offending stations disqualified. I have my own thoughts but I would like to know what you the readers of this column think. Ladies and gentlemen, your thoughts please?

At least two well-known overseas QSL Managers read these notes, namely Mary Ann Crider WA3HUP (a WIA member) and John Parrot W4FRU. Mary Ann and John here is an open invitation for you to say how you would like to receive cards and to divulge the secrets that you may have developed over the years to receive the cards for those amateurs that you look after.

FACT — NOT FICTION!

After my comments in the above paragraphs here is another one to consider. It appears that F0AT has said and it has been related by N7RO 'I will be leaving New Caledonia in a few months, and all that want a QSL for FK0AT, FK025AT, C21NI, YJ8MC, YJ0KMS, FK0AT/FW should send as soon as possible with their card US$1 for each contact. All QSLs sent via the bureaus or N7RO, will not be honoured. They must be sent direct with $.' All I can say is this — is our privileged hobby becoming commercialised and prostituted to this extent? Also does his society if he belongs to one condone his operations being handled in this manner?

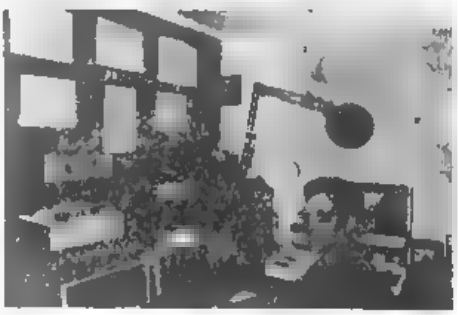
YES, NO OR ???

Members of the well known Spanish LYNX DX Group are due to activate the call sign S0RASD, in August, from the Saharan Arab Democratic Republic (SADR) which is roughly in the area that was known as Rio de Ora and used the prefix of EA9.

The suffix stands for Republica Arabe Saharaui Democratica and SADR is recognised by the member nations of the Organisation of African Unity. The big question is, will the Newington DXCC desk share the same view. Again a case of work first and worry later.

ANOTHER OPERATORS SHACK

In the quest for the best looking shack and the handsome prize that has been kindly donated by GFS Electronics, pictured is the VK6NNG DXing shack. This photograph will be considered by GFS Electronics when they pick the winner. Have you submitted your shack for the competition yet.



SENSE OF HUMOUR

Iris and Lloyd (W6QL and W6KG) respectively still have their sense of humour after all that has happened!

In their usual letter writing style, this has been received.

"Dear Friends,

" A dictionary gives the following information: MAL — means evil, harmful, hurt, bad; DIVE — means fall or plunge.

"The dictionary is absolutely correct because on February 4, whilst leaving the Maldive Communications Office, Iris slipped . . "

The rest has been previously published, but this duo have real internal fortitude, for want of a more descriptive word. To you both, every good wish and to Iris a very speedy recovery from a very nasty injury from all your friends from 'down under'.

All QSLs, or letters via YASME.

I have been told of the beauty of the Maldives from Soma 4S7YL/VS9YL/ 8Q7YL, the first YL to operate from both areas, (unfortunately now a silent key) and her two daughters Chitra and Luchmea, who spent a considerable part of their

childhood in the archipelago which is located in the Indian Ocean approximately 700 kilometres from Sri Lanka and 600 kilometres from India and consists of in excess of 2000 islands. Only about 200 of these are inhabited and under the local law only nationals are allowed to own land and its improvements, however a lot of tourist hotels and entertainment centres are leased to foreigners. The islands are surrounded by brilliant white sand and water so clear that one may, if skin diving, have a visibility of up to 50 metres in a climate that averages between 26 to 30 degrees Celsius in the shade all the year round

Incidentally, Lloyd and Iris have finished this stint and ended up with figures like this:

Call	Country	QSOs	Countries (Confirmed)
FR5/W6QL	Reunion	8 000	148
FH/W6KG	Mayotte	8 000	144
D68OL	Comoros	9 000	152
S79WB	Seychelles	9 000	130
8Q7QL	Maldives	4 000	120
5Z4XG	Kenya	7000	135

The question is where will this happy duo turn up from on their next tour?

Frank OK1DFR runs a FT101D and with his wife Ivana OK1DYL, is interested in the low bands. Frank is a watchmaker specialising in antique varieties.

ANOTHER PREFIX

VA3T has been recently heard and worked. It appears that it is another VE 'special', one of many in the last few years and they are getting more confusing as the years go by. Unfortunately it reminds me of the VAT tax. Who mentioned the unmentionable? ? ?

Whilst on the subject, here are a few more that may have been worked or will appear in the future. CN5SE, was used for the Semaine du Cheval (Horse Week). QSL via PO Box 299, Rabat, Morocco.

The call sign 6C40, has been issued to four stations to honor the national society's 40th birthday. It appears that special cards will be struck for the occasion by the Technical Institute of Radio for the event in December

ST HELENA ISLAND

Have you worked Adrian ZD7AF? Adrian is St Helena's youngest amateur at the age of 15 and is the son of proud parents ZD7XY and ZD7BJ. Congratulations Adrian

HEADACHE

If Joe W3HNK, suffers from headaches, it is no wonder

He is the QSL Manager for CQ1NH, CR1NH, CS1NH, CT1NH, CQ2NH, CQ4NH, CQ5NH, CQ6NH, CQ7NH, CQ8NH, CR2NH, CR4NH, CR5NH, CR6NH, CR7NH, CR8NH, CS2NH, CS4NH, CS5NH, CS6NH, CS7NH, CS8NH, CT2NH, CT5NH, CT6NH, CT7NH, CS8NH, CT2NH, CT5NH, CT6NH, CT7NH CT8NH

Wait for it, they all belong to the same guy, CT4NH, who is a prefix hunter enthusiast and is on the Honor Roll — no wonder! Good luck Joe, and not too many analgesics.

DESERTING

Really the heading is not fair as this is one thing that Percy VK3PA, would not do.

Percy is leaving the 'Garden State' and is heading towards the 'Sunshine State', to live there permanently. Percy will be greatly missed by the VK3 'gang' as this gentleman is approaching becoming of an octogenarian, who is still rated as a number one net controller. Percy every good wish to you and please get set up quickly in your new QTH, and rejoin the net operations that you have given so much of your time to over so many years.

INDONESIAN SILENCE

It appears that the amateurs in this country could have been asked to 'refrain' from transmitting from March 17, to May 1, because of the general election that was held on April 23.

ST PETER 1 ISLAND

The breakdown of the log from the expedition is as follows. Total QSOs were 15 841. 10 090 SSB, 5 703 CW and 48 on RTTY Bands: 160m = 29, 80m = 587, 40m = 1 189, 20m = 9307, 15m = 4 570 and the balance on 10 metres. The breakdown of the areas is quite interesting as the USA/VE heads the list with 9 367 contacts followed by Europe with 2 736, then the JA and Asia area with 2 370 entries in the log. Central and South America accounted for 917 lines of the log with VK/ZL/Oceania accounting for a mere 276 plus the residue being classed as miscellaneous. After I have made you get your calculators out to find the missing figures one has to wonder how many of the 'lucky' ones deserved the country by working it a number of times, depriving the less fortunate DXers of a new country that could be quite rare due to its location and the difficulties and economics associated with making a landing on the island.

ANOTHER NEW CALL

TV7GLC has been allocated to the Normandie Radio Club in Rouen for use on all bands and modes until the end of this month. The occasion is the 900th anniversary of death of William the Conqueror. Special QSLs are reported to have been struck and are obtainable from F6DLM. Unfortunately there is no mention of cards being available via the bureaus.

THE ANTARCTIC SUMMER

Did you complain about our lack of summer this year while you are reading this at the start of winter? Spare a thought for the Antarctic inhabitants who, on Mawson Base, had a maximum temperature of 3.9 degrees Celsius whilst Macquarie Island suffered a 'heatwave' of 10.7 degrees in December. Casey Base endured 19 days of snow in December and 12 in January where the maximum temperature of 9.2 degrees created a record since the base was created and [redacted] after the late highly distinguished Lord Casey, who took an active personal interest in the research projects that were undertaken and created numerous messages of his enthusiasm to be forwarded to the duty crews.

Still feel cold and huddling closer to the fire in the southern States, think that the lowest temperature at Mawson reached -6.7 degrees in December and Macquarie Island recorded 109 mm of rain. I will not depress you anymore, spring will soon be here!

LIBYA

Whilst Hubert continues his activity as 5A0A, to the joys of many, his Manager has asked that the call sign or any relevance to the hobby should NOT be shown on the envelope.

Address all correspondence to Wieslaw Ziolkowski, PO Box 253, 50-950 Wroclaw 2, Poland. IRCs are preferable in this instance

It is felt that it is good practice to refrain from putting call signs and any notes on envelopes that would imply that the recipient is an amateur radio enthusiast, as the unscrupulous will be tempted to remove the monetary contents. It purportedly happened to one call sign owner on an island in the Indian Ocean a few years ago, and this is the excuse that the operator gave for not QSLing. If it is fact or fiction one will never know.

SURVEY

John Parrot W4FRU, Chairman of the ARRL DX Advisory Committee, is conducting a survey on the future of the ARRL DXCC. Input is required from all DXers. You may have your say and a survey form is available from John with a SAE and funds to cover return postage.

The address is — ARRL DXAC Form, PO Box 5127, Suffolk, VA23435, United States of America.

If you are interested in DXing and the DXCC future, please put your input into John, so that he may deliberate on it with his committee. Comments from all DXers are required to give a cross section of the users thoughts. I feel the readers and John are aware of my thoughts already.

Congratulations to John and his committee on the democratic approach they are taking in the formulation of the criteria on DXing that will take us into the 21st century.

UNUSUAL CALL SIGNS

Recently some lengthy, unusual call signs such as CW66PAX/7BY CW66PAX/5BW CW66PAX/8CB, CW66PAX/1TE and many others were heard. These calls emanated from Uruguay to commemorate the first Papal Visit to South America.

Pope John Paul's visit to Victoria allowed the use of a special amateur call sign, however very few amateurs knew of the security and police enforcement that was involved, with the dignatory's visit.

The Victoria Police force proudly boasts that it has the most modern police communications system in the Southern Hemisphere (Refer AR August 1982 p6). This facility has been enhanced with the addition of an aeronautical Video Unit known as The Victoria Police Video Operations Unit which, during the papal visit gave the D24 Control Complex, a 'birds eye view of all the proceedings from the Dauphin helicopter that hovered overhead. The 'chopper' was equipped to allow video to be relayed from the flight deck to a remotely controlled tracking microwave dish on top of the building housing the Police Communications Complex.

Much planning went into this facility that has become an integral part of the updating of law enforcement within the force in Victoria, which owes its success to the Chief Commissioner Mr Mick Miller, a man noted for his precision, forward thinking and guidance who led his dedicated staff to obtain this status.

The officer in charge of the Operations Centre during the visit of the Pope was Deputy Commissioner (Operations) Mr Kel Glare, who stated 'My role as police commander of the operation was to, if possible, resolve any incident without loss of life, injury to any person or damage of property.

'The live-eye TV coverage gave me the ability to see some of the general scene which added reality to the written and oral communications I was receiving. I was able to develop a feel for the situation which assisted in the vital operational decision making'

A quietly spoken and unassuming Mr Glare succinctly added 'One picture is worth a thousand words.'

Video Operations Unit's Senior Constable Trevor Beattie demonstrates the required aerial technique. The operator relies on a full harness to prevent him from vacating the helicopter and actually joining the birds!

Photograph courtesy of Police Life

BITS AND PIECES

Khalid A61AB, is still quite active and valid for DXCC. QSLs to **Mary Ann WA3HUP**. ** **Luigi HB9KLI**, has come to the conclusion it is never too late, as he recently received cards from **VR1Z** (QSO date February 1966) via Yasme and **VK0WR** (QSO date March 1960) from VK6RU. ** If you

worked **Mike KH6OF** as **FO0OK**, QSL to **W6TM**, not the FO Bureau. ** The call **4W1AA**, is still cropping up in overseas reports. No one seems to know if it is genuine and no one to my knowledge has a card or documentation. Work first and worry later! ** **4K1AH**, is quite active and his QTH is the **Soviet Union's Mirny Base** in **Antarctica.** ** Apparently **FR5ZU/E** has been active from **Europa.** The fortunate may QSL via **PO Box 4, F-97490, Sainte Clotilde, France.** ** **XF4OX** is now accredited for DXCC. ** **Tom VR6TC**, is home on **Pitcairn** again after a considerable absence due to ill health. Hope to hear you on the bands more frequently Tom. ** If you worked **KG4GX** from **Guantanamo Bay.** QSL to the home call **KG6GXO.** ** **V47KJI** was **W2BJI** operating from St Kitts. ** Special postal covers and souvenir cups are available to commemorate the establishment of **St Peter 1 Island as a DXCC country**. Further details from **Einar LA1EE.** ** Fifteen people are working on the **31EE/3Y2GV** cards, so please be patient.

CALL SIGN CHANGE

Ron ex-VK3BEE, a keen exponent of the 160 metre band has relinquished this call and taken Tony's VK3IO call. Tony ex-VK3IO, has moved interstate. Ron says that a two letter suffix is an advantage and 160 metres will benefit. Good luck Ron with the low band 'goodies' and also good luck to Tony and his wife at their new QTH in VK1.

LISTENING AND WORKING

Jim VK3YJ, did quite a lot of listening over Easter, obviously whilst waiting for the Easter Bunny. Jim heard many stations working Hubert 5A0A on 14.144 MHz at 1216 and 0630 UTC. Jim had a ball on 20 metres during an all night stint from after midnight until nearly sun-up. During the early hours he picked up some of the following jottings.

Peter ZK3PM has stated there will be no QSLs until he returns home in September this year. SM2DWH/8T0 was operational from the slopes of Mount Everest. LA2GV, was quite ORV working stations in the USA. congratulations on the card for St Peter 1st Island, Jim. Another note from Jim's diary is that GB2NES, was a special event station commemorating the news broadcast service in the United Kingdom.

HEARD AND WORKED ON THE WEST COAST

1.8 MHZ

K1ST/6W1, DJ6QT/9L* OH1RY/CT3, CT3CU*, DL6EN, G3OFW, LA8AW, ON5NT, SM4CAN, TU4A, UA9CBO, VEs and Ws.

3.5 MHZ CW

DJ6RX, EA4MY, EI8EI, G3NKS, HA5KF, LA5LT, OE7PGJ, OK3EQ, OY7ML, PA3CCF, SP1DPA and UQ2GP.

3.7 MHZ SSB

4M0ARV* DJ6QT/9L, EA9KQ, FT8WA, KN4BPL/KH3 and VK0DA.

7 MHZ CW

4M0ARV* CW6PAX*, FM5BH, FT8ZA, HS0B, LH8EAH and UM8MFB.

7MHZ SSB

4C2A, 5L6D, 5Z4SS, 7Q7LW, 8R1RPN*, CN8EL, CT3CU, OH2KI/CT3, D44BC, EA8RCT, FT0ZA, HH7PV, HV3SJ* NP4CC, PY0FG*, TE2Y, TZ6BG, VK0DA, VP2EC, WL7E and ZF2KT.

Note * Denotes heard and not worked.

CW SWLING WITH ERIC L30042/VK5

1 MHZ

FK8EJ, G3SED, GI3OOR, LA5SAA, P29PL, UZ0LQX, VK8MQ, VU2REC, YV5ANT, ZK1DD and ZL7DE.

10 MHZ

DL8AN, EI5DR, G2BY, G3HEJ, G4UJI, JF1CCI, KF7E, KM2S, NH6BH, ON4KLG, SM6CYZ, W1CCN, WS4 and W6OV.

14 MHZ

CE2JHE, DL8OB, N7ET/DU7, EA1TY, F5IN, FK0AV, G3ZOA, G4TYF, H 8LC, I2CWF, K2EGL, IK5DEY, I0BVP, OK3FON, OH5NM, ON7YO, RO4OZ, RE4AC, SM5CIK, UA3RLO, UA4YA, UB5JWA, UB5MIF, UA6ARE, UA0LU, UZ9CWO, UP2BW, VE3UDX, W4HAM, YB0TK, YU2BHI, ZK1DD and ZS1AAQ.

21 MHZ

HL1ZP/DU1, JF2UAQ, JA3YBF, JA8YBY, UM8MIY, UM9MWA, YC0BLO and YC0JYI.

28 MHZ

VK2RSY and VK5WI Beacons.

HEARD AND WORKED ON THE EAST COAST

3B8CA, 5H3RB, 5N9GMC, 5Z4JB, 7J1ACH, 8P6OB, 8R1RBF, 9J2BO, A61AB, A92EM, BV1IA, CE0ZIG, CP5LE (YL), CT1BCR, FM5CL, FO5JV, FT8WA, GW4WEQ, H44AF, HA3HA, J73LC, OA4ED, OX3KM, OZ7TM, TA1E, TI2LTA, V85RM, VK0DA, YV2NY, YZ7AA, ZL7AA, ZK1DB, ZK2EKY and ZK3PM.

SOME QSL INFO

K1ST/6W1 K1MM, DJ6QT/9L DJ6QT, CW6PAX CX2CO, FM5BH:W3HNK, KN4BPL/KH3:WB4MJH, SM2DWH/8T0:SK4NI, ZK2EKY:VK2EKY.

THANKS

Sincere thanks to the Editors of weekly, bi-weekly and monthly publications such as: *ARRL Newsletter, BARG, CQ-QSO, The DX Family Foundation Newsletter, Inside DX, KH6BZF Reports, Long Island DX Bulletin, NIAR News Letter, Papatoura Radio Club Bulletin, ORZ DX, RSGB DX News, ORZ DX, RSGB DX News* and *The W6GO/KH6HHO QSL Manager List.*

Magazines including *Break In, cqDX, DX Post, JA CQ, JARL News, KARL News, Meteorological News, OST, Police Life, RadCom, Veron, Weather News* and *Worldradio*, to mention but a few.

Individual contributors this month include VKs, 3IO, 3YJ, 3YL, 8NE, L3-0042/VK5, ON7WW, Senior Constable Susan Tattersall and research by the staff of the Lilydale Municipal Library at the Lilydale and Mooroolbark Libraries.

Sincere thanks to one and all who again have made this column possible and good DXing.

ar

THE FIJI ISLANDS

Usually described as a Pacific paradise, the Fiji Islands that straddle the 180 degree meridian, 1800 kilometres south of the Equator, is the home of 32 amateurs according to the *International Call Book*.

Fiji is an archipelago of more than 300 islands, ranging from tiny coral atolls, limestone islets, to the two larger islands of Viti Levu and Vanua Levu which comprise 85 percent of the total area of 7022 square miles (18 000 square kilometres). It has been estimated that 30 percent of the islands are occupied with a population being in the vicinity of 750 000 people who enjoy a moderate climate where the temperature seldom varies from round the 24 degrees Celsius mark. The humidity increases around January through to March, due to the precipitation and at times cyclonic conditions do exist, which unfortunately, at times, have devastated the area.

The Islands were discovered by European sailors over a period of some 300 years. The Dutch explorer Abel Tasman, sighted some of the area in 1643. Captain James Cook, charted other islands in 1774, but Captain William Bligh, charted the majority of the area, when sailing through the area after the Bounty Mutiny in 1789.

The Fijians are very proud people, and the legend is that the great chief Lutunasobasoba led his people across the seas from South-East Asia via Indonesia and Tonga, resulting in an admixture of Polynesian blood and attitudes. More European influence occurred during the 19th century, causing friction and a British Consul was appointed to the area in 1857. His presence assisted the missionaries and the traders. In 1874, Fiji was officially taken over by Great Britain.

This official annexation, changed the Fijian society dramatically in that the influx of sugar and cotton planters wanted labour. The Fijians were neither interested in work or the recompense that they would receive and Sir Arthur Gordon, Fiji's first governor, sought labour from India, importing people as 'coolies', who had the right to return if they wished. Between 1880 and 1916, 62 837 Indians were imported. Less than one-third wished to return to their homeland. It was estimated in 1920, there were 39 000 Indians in Fiji, but uncontrolled migration and a high birthrate, it was estimated that the Indians outnumbered the Fijian population by 1945. Present estimates are that the Indian and Fijian population is evenly balanced even though 60 percent of the population is under the age of 25 years of age.

The Indians dominate the lifestyle in this exotic area. Most shopkeepers, lawyers, doctors, importers are of Indian descent, and there is virtually no marriages between the two races who do not generally mix socially. Even the plantations of rice and sugar-cane are controlled by the Indians, who own less than two percent of the land and lease the rest from the Fijians. In October 1970, Fiji was granted full independence.

Fiji's first and only Prime Minister is Ratu Sir Kamisese Mara, a hereditary chief and graduate of Oxford University, has guided Fiji even though his party did not win a majority in the April 1977 elections, which are based on a very involved electoral system that ensures a racial balance and the rights of the Fijians. A later election in September, saw the previous two seat defeat of the National Federation Party reversed dramatically by them winning 36 of the 50 seat Parliament. They were also re-elected in mid-1982.

The islands rely on chiefly agriculture and tourism. Sugar cane is partly processed and exported in vast quantities such as nearly half a billion tonnes in 1985 bringing in a income of F$160 million. Other exports are copra, cocoa, ginger and in the future wood chips, wood pulp and timber from vast plantations are envisaged. Small quantities of gold are mined and exported whilst tourism attracted some 250 000 visitors, quite a few dollars per person would be anticipated to be spent in the shops, markets, motels and hotels.

Any vast industry is at present hindered by inadequate power which is obtained from imported fuel, but a large hydro-electric complex in Viti Levu is being gradually brought on line to ease the demand.

It is coincidence that two races so far apart in their historys, one indigenous and the other that has migrated over the years, should indulge in 'fire-walking', each for different reasons. The Fijian's Sawau people, who live on Beqa Island, can walk on white hot stones, heated by a huge log fire and this phenomenon has been handed down through the ages and is legendary. Indian fire-walking is done for religious purposes and is practiced by the Madrasis sect of the Hindu religion. Those that walk on the hot stones generally adorn their bodies with vivid coloured dyes and their bodies are pierced with needles and it is said to be a cleansing of the soul.

No story would be complete without mentioning the drinking and manufacture of Yaqona, or Kava which is made from the root of the pepper plant. In early days long past, the roots were masticated in the mouths of the young maidens of the village, until it was a pulp, then it was placed in a receptacle and mixed with water. In this day and age, more hygenic methods are used such as a pestle and mortar and it is strained before being placed in a half coconut shell and passed around like a chalice by groups of men from the village.

Many amateurs are active from the 3D2 prefix and are also in demand from country hunters. If you have the chance and can engage an operator in a lengthy QSO, ask him or her to explain a little of their history and some details about the superb museum which is located next to the home of the Governor. I am sure you will enjoy the contact and it will give you the incentive to visit the islands and meet these friendly people. Good hunting for a 3D2 prefix.

ANTIQUE QSL CARD

Courtesy Peter Wolfenden VK3KAU

AMSAT Australia

Colin Hurst VK5HI
8 Arndell Road, Salisbury Park, SA. 5109

NATIONAL CO-ORDINATOR
Graham Ratcliff VK5AGR
INFORMATION NETS
AMSAT AUSTRALIA
Control: Graham Ratcliff VK5AGR
Amateur Check-In: 0945 UTC Sunday
Bulletins Commence: 1000 UTC
Primary Frequency: 3.685 MHz
Secondary Frequency: 7.064 MHz
AMSAT SOUTH WEST PACIFIC
Control: John Brown ng W6SP
Bulletins Commence: 2200 UTC Saturday
Frequency: 14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian Elements from the AMSAT Australia Net. *This information is also included in some WIA Divisional Broadcasts.*

ACKNOWLEDGMENTS
Contributions this month are from Bob VK3ZBB, and Harold Price NK6K and Jeff Ward G0/K8KA.

AMSAT-AUSTRALIA'S NEW ADDRESS GPO Box 2141, Adelaide, SA. 5001

Most readers of this column are probably aware that Graham VK5AGR, for the last four years, has been the Treasurer for the SA Division of the WIA. Therefore, with the permission of the Divisional Council, AMSAT- Australia has been using GPO Box 1234, Adelaide as its mailing address and all moneys have been processed through the Division. However, due to his ever increasing commitment to AMSAT-Australia, he has decided to resign as Divisional Treasurer as of the AGM on April 28, 1987.

At the Divisional Council meeting on March 20, 1987, Council decided that, due to 'Standing Orders' Graham could no longer have direct access to 'Box 1234' after the AGM as he would no longer be Treasurer, or a member of Council. It was therefore suggested that he arrange a separate box for AMSAT-Australia as soon as possible. As indicated above, the new box number is 2141 — not as easy to remember as 1234 but hopefully, given time, most will associate AMSAT-Australia with Box 2141.

Similarly, as Graham will no longer be Divisional Treasurer, AMSAT- Australia moneys will no longer be handled through the Division, therefore, can all future money orders and cheques be made payable to "AMSAT- Australia" rather than the WIA.

AMSAT-UK FUJI TECHNICAL HANDBOOK

The AMSAT-UK 'FO-12 Technical Handbook' is now available from AMSAT-Australia for $15 including air mail postage.

It is a 76 page A5 (half A4 size) loose-leafed booklet containing all the information that is currently available concerning FUJI OSCAR-12 or JAS-1. AMSAT-UK also offers an 'Update Service' for the Handbook for the cost of a 'Small Donation' (to cover return postage) and returning a completed 'FO-12 Update Information' card.

UOSAT-2 (OSCAR-11) DIGITAL COMMUNICATIONS EXPERIMENT (DCE) — VK Gateway

On March 19, 1987, Graham VK5AGR, received a DCE Encoder from Jeff Ward G0/K8KA of the Department of Electrical Engineering, University of Surrey, Guildford, Surrey, GU2 5XH, England. The DCE Encoder will allow Graham to act as a Gateway to the DCE 'Store-and-Forward' package on UOSAT-2 (OSCAR-11).

At the time of writing this column (April 18), Graham had successfully uploaded and downloaded messages from the DCE but had not completed his HF modem to enable VK stations to forward messages to the DCE via the VK5AGR BBS as a HF Gateway. Hopefully, Graham will have his BBS operational on HF by the time you read this column. Graham is particularly interested in hearing from educational institutions who would like to communicate with educational institutions with similar interests in the UK and USA via a HF Gateway using the DCE on UO-11.

Unfortunately, when Graham activates the DCE on UO-11 this will result in the interruption of the normal Telemetry, Bulletin or Whole Orbit Dumps (WOD) on the 145.826 MHz beacon. After Graham has successfully commanded the DCE ON, DCE Title Frames will appear on either the two metre or 70 cm beacon. On occasions, the two metre beacon may be switched off entirely as the two metre beacon tends to desense the two metre Command Receiver on UO- 11. After one or two cycles of the DCE Title Frames, Graham will commence DCE operations, ie upload a message using the 'PUT' command, download a message using the 'GET' command or kill a message using the 'KILL' command. Graham has supplied the following information on the date format of DCE to enable stations having a mutual window with UO-11 to decode the 1200 Baud date exchange between Graham and the DCE with the same 1200 Baud Demodulators used to decode normal UOSAT 1200 Baud telemetry. NB: DCE uses eight-bit ASCII, not seven-bit as is used for the normal telemetry.

MSG2 PROTOCOL

The MSG2 protocol was designed primarily to be easy to implement. Its only other goal was to provide the minimal message handling capability to PUT a message on the DCE, to GET one back, and to KILL a message no longer required.

As "easy to implement" dictated a single user approach, a LOGON and LOGOFF capability was added to keep two or more ground stations from starting message transfer operations simultaneously.

Experimentation with minimal ground stations is planned: the MSG2 protocol was designed to accommodate this activity. Messages are broken into small (64 Byte) blocks with CRC error detection. Once a message transfer is begun, message blocks can be acknowledged at any time, and in any quantity. This allows a battery powered station to reduce its transmissions by requiring only one acknowledgment for a message of any arbitrary number of blocks. Unacknowledged blocks are retransmitted in a "round robin" fashion.

DCE blocks are acknowledged by sending a bit map frame. The bit map contains one bit for each block in a message. Bits set to 1 represent unacknowledged blocks, and 0s represent acknowledged blocks (Figure 1). The transmitting station continues to send the blocks indicated by 1 bits, until a bit map is received with all bits set to 0.

Figure 1: Example of a MSG2 Bit Map.

```
7 6 5 4 3 2 1 0 (1)
0 0 1 0 1 0 0 0 (2)
0 1 2 3 4 5 6 7 (3)
```

(1) numbering of bits in bit map (MSB is 7)
(2) bit map ack'ing all but blocks 2 and 4
(3) blocks represented by bit map bits

MSG2 FRAME FORMAT

This section is not meant to provide a formal MSG2 protocol specification, but to outline the structure of the protocol and the frames used by it. Frame types may be added or removed as the protocol matures.

Although there are several types of frames, they all share the following format:

<10h><03h><cmd><cmd not><data length><data><crc>

Each byte is sent as an asynchronous character with eight data bits and no parity bit. Frames are preceded by several SYN Bytes <16h> for modem and timing synchronisation.

Frame Breakdown:

<cmd> — A single ASCII character specifying a DCE command.

<cmd not> — The inverse of <cmd>. This Byte can be calculated by <CMD> XOR FFh or by 255 minus <cmd>.

<data length> — A single Byte giving the length of the <data> portion, in Bytes. Data length is between 0 and 128 Bytes.

<data> — <data length> Bytes of data. This data can be either ASCII characters or binary bytes.

<crc> — Two Bytes of cyclic redundancy check. The CRC is a type of checksum, and it covers everything from <cmd> to the end of <data>, inclusive.

In order to assure that <10h><03h>, the beginning of frame marker, does not get transmitted in the frame, all <10h> Bytes other than the one at the beginning of a frame are doubled. That is, during transmission, <10h> is converted to <10h><10h>. When receiving a frame, after the first <10h><03h> has been detected, all <10h><10h> sequences should be converted to a single <10h>. If a non-doubled <10h> is encountered in a frame, it is an error.

MSG2 CRC

Every frame transmitted by the MSG2 ends with a two-Byte Cyclic Redundancy Check (CRC). The CRC is an error detection code, and if you use the CRC equation on a received frame, your two-Byte answer should match the two Bytes transmitted at the end of the frame. The CRC used by MSG2 is calculated using a modified CCITT CRC algorithm. A Z80 machine-language program showing how this is done is provided in the appendix.

The CRC calculation includes all Bytes from <cmd> to the end of <data>. The CRC calculation is done prior to doubling <10h> Bytes and, by the receiver, after removing the extra <10h>.

TITLE FRAMES

The DCE was required to "do something interesting" when it was idle, ie not performing a function at the specific request of a ground station. To this end, MSG2 sends the first line of each active message on the downlink when it is idle. This line is the message "title" and usually contains at least the source, destination and subject of the message. Ground stations can see if they have any waiting traffic without interacting with the DCE by simply copying these title blocks. The OBC DIARY program currently switches the DCE onto the downlink for 30 seconds at roughly five minute intervals.

Title frames provide a way for stations not directly involved in DCE operations to monitor DCE activity. The <cmd> Byte in a title frame is "T". The contents of the <data> portion of a title frame are as follows:

Message number, 1 byte. If the first bit of this byte is set, the message is not complete, and the message title may be invalid. Message numbers for complete messages run from 0 to 127.

Message length, 1 byte. This is the length of the message that is stored on the DCE, it is not the length of this title frame. Multiply this by 64 to get the message length in bytes.

Call sign of station using DCE, 9 bytes of ASCII. If no one is using the DCE then this will be nine blanks.

Title of message, the remaining <length> minus 11 bytes of the <data> field. This is taken from the first line of the message. The length referred to above is the FRAME LENGTH (which follows the inverted command). The 11 accounts for the message number, message length and call sign data.

The title for message number 0 contains MSG2 administrative and status information. It currently contains MSG2 version number, a counter from the error detection and correction (EDAC) memory, the number of free memory blocks available, the number that will be assigned to the next message, a counter that is incremented every time

MSG2 rece ves a valid frame, an error indicator and an ndication of which bank of RAM is active. Message 0 itself is used to download portions of the program variables, nc uding a table of memory address where the EDAC circuits have corrected an error

OTHER FRAMES

The above nformation and a short computer program will allow casual ground observations to monitor DCE activity. During actual DCE operations, however, several other frame types are used The following command frames are used by DCE ground stations, and the list provides insight into the operation of the MSG2 mai box

LOG N tells the DCE the call sign of the ground station.

LOGOUT frees the DCE for use by another ground station. Logout is automatic if the DCE does not hear the ground station for two minutes.

PUT is used by the ground station to store a message to the DCE

CONTINUE allows the ground station to continue (on another orbit) a PUT operation that was interrupted by LOS.

GET is used to retrieve a message from the DCE

KILL deletes a message

END resets DCE software to the title-display mode without logging out the ground station.

Thus. the DCE has all of the commands needed in a computer bulletin-board system

MESSAGE FORMATS

MSG2 is a data-transparent system, ie messages are stored as a single string of eighth bit bytes. Message content does not effect and is not effected by communication through MSG2 Most messages, however will follow a fixed format for their f rst l ne The first line s defined as the text up to the first <cr>, or 116 characters. This is the part of the message that s sent on the downlink in title blocks

Person-to-Person Messages

The following format is used for standard mess-

To:<call> De:<call> Re:<title>

The call can be up to nine characters. There are no spaces after the colon in any field

For example

To:G0/K8KA De:NK6K Re:Software updates

The To: and De: fields are the call signs of DCE ground stations.

A future command in MSG2 will permit messages in this format to be searched by To: field and downlinked n a group. The format is flexible, and fields may be added to it f the DCE is used for other than direct ground station to ground station data transfer.

DCE CRC ALGORITHM

The routine below can be used to compute the checksum for reception of DCE frames. The HL register is cleared before the f rst byte is received. Each byte is acted on n turn. When all bytes have been check- summed, the result is compared against the received checksum The L register contains the f rst byte received, the H register the second

```
;
;       COMPUTE CRC ON A, INTO HL
;
CKSUM
        LD B,8
        LD C,A
CRC2
        LD A,C
        RLCA
        LD C,A
        LD A,L
        RLA
        LD L,A
        LD A,H
        RLA
        LD H A
        JR NC,CRC4
        LD A,H
        XOR 10H
        LD H A
        LD A,L
        XOR 21H
        LD L,A
CRC4:
        DEC B
        JR NZ, CRC2
        RET
```

In using this program on DCE frames, remember that the CRC covers all bytes from the <cmd> to the end of the <data> segment, inclusive. It does not include the CRC itself, or the leading <10h><03h> bytes Also, CRC calculation is done prior to doubling <10h> bytes and. by the receiver, after removing the extra <10h> To check your CRC program, CRC check the characters "TEST MESSAGE" The resu t should be CRC bytes L=253 and H=223. 253 wou d be the byte transmitted or rece ved first

ar

SATELLITE ACTIVITY FOR THE MONTH OF FEBRUARY 1987

1. LAUNCHES

The following launching announcements have been received

INTL NO — 1987	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INCL deg
011A	Cosmos 1618	Feb 01	USSR	106.7	810	790	65.0
012A	Astro C	Feb 05	Japan	95.9	583	528	31.2
013A	Soyuz TM-2	Feb 05	USSR			see	note
014A	Cosmos 1619	Feb 07	USSR	88.7	254	197	72.8
015A	USA 21	Feb 12	USA*				
016A	Cosmos 1620	Feb 14	USSR	88.8	273	186	64.8
017A	Cosmos 1621	Feb 18	USSR	105.0	1029	983	82.9
018A	MOS 1	Feb 19	Japan	103.0	917	903	99.1
019A	Cosmos 1622	Feb 19	USSR	89.5	331	205	73.0
020A	Cosmos 1623	Feb 20	USSR	116.0	1536	1497	73.6
021A	Cosmos 1624	Feb 26	USSR	89.7	370	177	67.2
022A	GOES-H	Feb 26	USA				

* Department of Defence

2. RETURNS

During the period 29 objects decayed including the following satel ites

1986-080A	Cosmos 1770	Feb 02
1987-002A	Cosmos 1611	Feb 13
1986-005A	Progress 27	Feb 25
1986-014A	Cosmos 1619	Feb 18

3. NOTES

1987-012A — Astro C has now been renamed 'Ginga' ('galaxy' in Japanese). It is dedicated to high energy astrophysics and has telemetry frequencies of 400.000 MHz and 2280.000 MHz.

1987-018A — MOS 1 is a Marine Observation Satellite and has transmissions on 2220.000 MHz, 8150/8350 MHz and 1702.4848 MHz. Its nickname is Momo 1

1987-013A — Soyuz TM-2 had on board cosmonauts Yuriy Romanenko and Aleksandr Laveykin. The spaceship has docked with the MIR-Progress 27 orbital complex and will carry out scientific and technological research Progress 27 has now returned to earth

1987-022A — GOES-H is a meteorological spacecraft intended to provide world-wide weather coverage. It has been renamed GOES-7

—Contributed by Bob Arnold VK3ZBB

ar

MORSEWORD 3

Compiled by Audrey Ryan

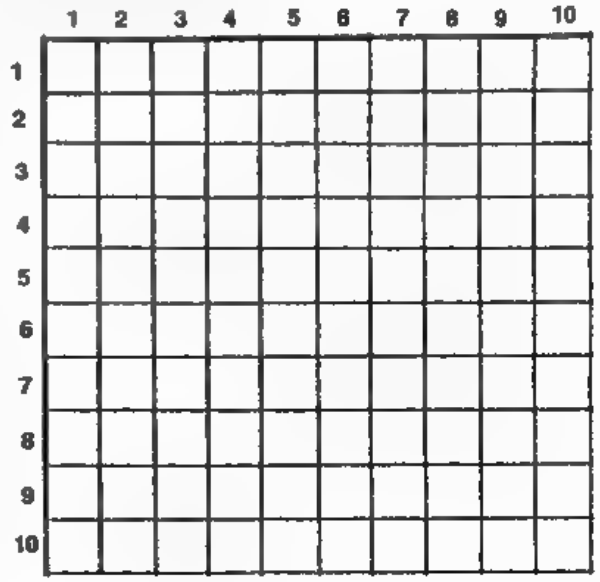
Wife of Joe Ryan VK3ABA

ACROSS

1. Painful
2. Barter
3. Part of a church
4. Stud
5. State (abb)
6. Poke
7. Indian garment
8. Bite
9. Blows
10. Interior

DOWN

1. Barren
2. Food
3. Corrode
4. Famous
5. Scottish garment
6. Scoff
7. Record
8. Currents
9. Turn inside out
10. Sped



Solution page 55. . .

TECHNICAL MAILBOX

MICROPHONIC SOLID-STATE EQUIPMENT

The amateurs of the valve era will well recall the problems in audio equipment where microphonics could be the plague of an Audio Amplifier. Rubber suspended valve sockets, and premium manufactured valves were all the go to overcome the "patter of little feet" causing the whole amplifier to oscillate in an ear-splitting howl! ! !

However, microphonics in solid-state devices! ! ! Yes, it can occur. It is not the chip rumbling around inside its plastic package, but the most likely cause is the socket into which it is fitted.

Eric VK5LP, having spent a lifetime in domestic appliance servicing, relates this relatively common problem in certain televisions.

The remedy is to remove the IC and carefully clean the pins with a non- conducting abrasive cloth (Scotchbright® or similar), spread the pins slightly and reinsert into the socket. If that fails to cure the problem, then replace the socket.

I came across this problem and initially thought I was hearing things! The above procedure cured the problem and one's sanity was restored.

ALUMINIUM CORROSION PREVENTION

This tip comes from Gordon VK2ZAB, and concerns the problem with corrosion of joints, connections, etc that can occur in antenna systems.

Utilux® sell an aluminium jointing compound H2397 (with zinc additive) and H2398 (without) which, when sparingly applied to joints or connections during the assembly of beams, etc, will preserve conductivity and guard against corrosion. Works like a "beauty" and saves the frustration of the yearly maintenance of your antenna system. Moreover, if you wish to make modifications, those joints will come apart with little effort and the aluminium will be found to be still bright and shiny.

COMMON FAULTS IN THE FT101B

John VK3RV, of Ormond, Victoria, has spent considerable time with this equipment and the following is a guide to rectifying some of the likely problems. In previous *Technical Mailbox* columns we have addressed similar faults, but here John provides the fine detail on the FT101B. Thanks John.

After having seen quite a number of FT101B transceivers with burnt-out power transformers and ruined 6JS6C final tubes, and studied the reasons for these tragic events, I figured that maybe I should share these reasons, along with preventative measures, with other members of our fraternity in view of the great expense involved in purchasing new tubes, (if you can get them) and/or a new or rewound power transformer. The bits and pieces used to prevent the above events only cost a few dollars, and may pay handsome dividends in the long term. . .

CAUSE No 1

The leakage, and subsequent insulation breakdown of the 80 pF coupling capacitor C13 reduces, and finally eliminates the negative bias on the control grids of the 6JS6Cs. Complete capacitor insulation breakdown applies a positive bias to the grids, with subsequent enormous plate current flow, thus ruining the tubes. This can happen with the transceiver on the RECEIVE mode as well. The tubes will crumple up with the heat, the power supply is now effectively short-circuited, and if the set is not switched off immediately, the power diodes and the power transformer may be destroyed amid clouds of evil smelling smoke. C13 should therefore be replaced with a 100 pF, 3000 or 5000 volt heavy duty ceramic disc capacitor. The correct value of 80 pF can be obtained by connecting a SIMPLEX 1000 volt SM (stacked mica) 470 pF in series. This gives extra protection for the future. The joint capacity of 80 pF may be 10 percent higher or lower. The foregoing operation is carried out by firstly removing the bottom cover of the transceiver, then the shield covering the bases of the valves and alignment screws. Next, carefully remove the screws holding the PB1092 circuit board. Gently swing the board to one side to expose C13. Cut this capacitor out and replace with the new ones. Replace PC1092 and shield. The 101B should now be realigned on all bands in accordance with the operator's manual.

CAUSE No 2

The same type of capacitor with the same shortcomings is used in series with the 6JS6C neutralising the variable condenser. If it shorts-out, the high voltage 600 VDC appears directly across this close spaced midget variable sometimes causing a flash-over with similar tragic results as outlined in Cause No 1. This is very easily replaced by removing the top of the final cage, being very careful not to have the set switched on. The capacitor, C125 on your circuit will then be easily seen. I replaced mine with two SIMPLEX SM (stacked mica) 1000 volt 330 pF in series. The joint capacity is not critical as long as it is at least 80 pF and not more than 180 pF. The final stage must then be neutralised in accordance with the instructions outlined in the Owners Manual. Neutralising the 101B, by the way, is a "piece of cake" providing NEC or Toshiba brand 6JS6Cs are used in the set and, you follow the instructions in the manual to the letter.

CAUSE No 3

If one of the 6JS6s develops an internal short circuit between the control grid and another element, this produces the same sort of situation as described above. Both tubes will be destroyed because of lack of bias or because of positive bias. Protection of the tubes and the power supply is effected by the installation of a fast-blow 400 mA fuse in the 600 volt line between the reservoir capacitor C77 and the RF feed choke to the final anodes. To do this, install a chassis mounting, open-type fuse carrier on the lower part of the side of the final box beneath the chassis adjacent to the two reservoir capacitor terminals. On most 101Bs there are two holes already drilled and tapped, so all you have to do is find a metal thread screw of the correct size and type, a washer, then screw it on. Break the red cambric covered wire between C77 and the feed choke, connecting the ends to the mounting base being careful to watch for pieces of floating solder and sharp chassis edges cutting into the insulation of this lead. Load this fuse carrier with a 400 mA fast-blow capsule. Next, remove the mains fuse capsule at the rear of the set, check its value, which should be about three amps working. However, I have found that a 1.5 amp working fuse is the correct value because the AC line current of the 101B from the 240 volt mains does not exceed 1.42 amps when the set is fully loaded. I strongly recommend the use of a fast-blow 1.5 amp working fuse here. You can, if you are a patient-type make your own 1.5 amp fuses by drilling one-sixteenth inch diameter holes in the ends of blown glass capsules and soldering in a piece of .004 inch diameter (38 B&S) copper wire. The blowing current for this fuse has been tested at 2.7 amps.

The foregoing modifications involving fuses should be carried out for Cause 1 and Cause 2. In fact, I would strongly recommend it for all FT101s. As the power factor of the normal amateur class equipment is pretty close to unity on our 50 Hz, 240 volts AC supply, the working current of the AC line fuse should be the makers full load rating in watts or volt amps divided by the declared line voltage which is normally 240 in this country. I would therefore recommend checking this on any mains operated equipment, and despite what the makers recommend, use the obvious calculations that I have suggested. Fuse capsules in a great range of ratings may be purchased at your friendly electronics store.

CAUSE No 4

In most cases, it appears that 400 PIV diodes are used in the FT101B high voltage power rectifier boards. Each diode has a 470 kohm, half watt carbon resistor in parallel, presumably acting as a surge suppressor and voltage equaliser. However, I have found in several sets that one or two of these 470 kohm resistors have open-circuited, thus causing a rise in potential during part of each cycle across the diode, because two diodes with their respective shunt resistors are connected in series in each leg of the bridge. The PIV can go above the rated 400 PIV under these conditions and it is my opinion that this causes many diode failures, sometimes resulting in raw AC being applied to the reservoir capacitor. The result is an enormous inrush of power from the transformer secondary. If protection is inadequate, not only all the power diodes, but the reservoir capacitors and power transformer may be destroyed. My remedy to prevent this from happening is to replace all eight diodes with 1000 volt PIV units, each diode shunted with a new 330 kohm half-watt resistor. A 1.5 amp (working) mains fuse as suggested for the previous cases would protect the transformer and reservoir capacitor. This job is a little painstaking, but not beyond the average person who uses hand tools and a small circuit board soldering iron. When removing the board (PB1076B) be careful that the wires are labeled as you unsolder them. Take care when installing new diodes and the new shunt resistors that you do not short-out tracks or sections. Clean up and check with a magnifying glass before reinstalling the board.

A NOTE ON MOULDED CAPACITORS

A noted magazine, in a recent article, suggests that moulded capacitors in which silver has been used in their construction should not be used in circuitry where DC voltage appears across them. The article stated that there was evidence of silver migration across the dielectric medium, which caused leakage, and eventually, complete breakdown of the capacitor. The foregoing technical description sounds ominously like the practical condition encountered in the failure of the 80 pF C13 and C125 in the 101B transceiver. Perhaps we should not use silvered mica capacitors in any DC-volts situation! ! !

TESTING EQUIPMENT AFTER SERVICE

The most careful person can, on occasions, make a wrong connection, leave a loose piece of solder, a nut, bolt or washer, floating around inside the equipment. Tragic results can, and do, occur because of short circuits when the 240 volts mains supply is connected for the test after service work has been done. A simple check can be made before applying the full-force of the 240 volt supply by connecting an ordinary 240 volt lamp in series with the supply cord. With a set like the 101B, a 100 watt lamp will glow bright yellow, then drop gradually to a duller colour as the heaters warm up and the filter capacitors charge. This would indicate that it is pretty safe to apply the full power to the set. With lower power equipment, use a 60 watt, or even a 40 watt lamp for this test.

TESTING POWER TRANSFORMERS FOR SHORTED TURNS

First, remove all load from the secondaries and from the tappings on the primary. A medium sized transformer, say 50 to 100 watt capacity, connected to 240 volts with a 15 watt, 240 volt, pilot lamp in series, should make the lamp glow from red to a medium yellow. Transformers rated at 100 to say 300 watts would require a 40 to 60 watt lamp for the test. The foregoing is a rough check for shorted turns. If there are shorted turns, the lamp in each case will glow almost to full brilliance.

Radio Amateur Old Timers Club

Kevin Duff VK3CV
PUBLICITY OFFICER
Radio Amateurs Old Timers Club

RAOTC DINNER AND AGM — March 5, 1987

The Radio Amateurs Old Timers' Club had its Annual General Meeting and dinner at the City and Overseas Club in Melbourne on March 5, 1987. This was well attended with 46 members present. Our retiring President, Max Hull VK3ZS, was Master of Ceremonies. There were apologies from 19 members who came from VK2, VK3, VK4, VK7 and also from John W6GTI, one of our American members. VK7LR and Bob VK3XZ, were welcomed as first timers at our dinner and members were very pleased to see Mr and Mrs Eric Trebilcock also. Eric looked after the Victorian QSL Bureau for many years.

Members enjoyed a four course dinner and, when coffee was served, Secretary/Treasurer, Harold Hepburn spoke briefly about the finances of the Club and thanked all people who had made a donation to make sure that the OTN Journal can continue to be published. He reported that our financial position was fair to good and looked forward to our next year. The motion was put that the Treasurer's Report be accepted. Moved by Mac McConnell, seconded by Lay Cranch, motion carried.

APPOINTMENT OF OFFICERS FOR THE COMING YEAR

Max Hull VK3ZS intimated that he could no longer stand for President of the RAOTC, but was willing, if required, to stay on the Committee. There was only one nomination for President and this was from Max Hull, who nominated Bill Gronow VK3WG for this position. Seconded by Kevin Duff VK3CV, and the motion carried unanimously.

Lay Cranch VK3CF who for many years has been a tower of strength for the RAOTC, particularly in regard to negotiations with DOC to get our own call sign and as Net Co-ordinator, has now retired from the Committee. A new member was needed and Harvey Utber VK3AHU was nominated. As there were no other nominations he was duly elected. All other Committee members were elected unopposed.

Max Hull spoke about some of the earlier days of our Club and the fact that he has had two-three year periods as President, as well as running his business, however he would be very happy to continue with Kevin VK3CV, to produce the OTN Journal. His message was that we should attempt to attract more younger members to our Club and not give the impression that we are all octogenarians. Max thanked members for having him for so long and said that he had thoroughly enjoyed this participation.

Bob Cunningham VK3ML, spoke about our late President and the great work he had done from the inception of the Club, right through to the production of the OTN Journals. A vote of thanks was given to Max VK3ZS.

GENERAL BUSINESS

Snow Campbell VK3MR, spoke about what he considered a great anomaly in the beginnings of the RAOTC. He felt the word "founder" should not be used and the word "organiser" should be substituted. The Committee agreed to look at our Constitution about this matter.

Lay Cranch VK3CF welcomed Harvey Utber VK3AHU, to the Committee and reminded all members that more of the 15 minute tapes, recorded by them and on any interesting subject, are required for our monthly net. Tapes (no longer than 15 minutes, please), can be forwarded to Mac McConnell VK3RV, 23 Stewart Street, Ormond, Vic. 3204.

A discussion about ways to recruit new, younger members to our Club followed and several ideas were put forward. These will be investigated by the Committee.

A very interesting video tape about the world of amateur radio was played which was very well received by all present. Thanks to Max VK3ZS and Harvey VK3AHU.

New President, Bill Gronow VK3WG, then spoke to members. He believed that the discussion earlier about new members should provide the Committee with several ideas to think about.

As Max VK3ZS, has offered to be Master of Ceremonies for future events, this offer should be taken up by the Committee.

Bill told an amusing story about obtaining his first receiving licence in 1922. In those days, you had to have a Morse test to own a receiver and for this Bill went, on his bicycle, to the South Melbourne Post Office and asked the Postmaster to give him a test. The problem was that the Postmaster only had a sounder, which Bill had never used. He went home and brought his own buzzer to the Post Office. All went well and Bill passed the 12 words-per- minute test, listening to his own buzzer! Bill said that he was grateful for the compliment of being President and would do his best for the Club. He then declared the 1987 AGM of the Radio Amateurs Old Timers Club closed.

Wireless, or radio for people now, has been around since the turn of the century. It is hard to conceive what those days were like. The following snippets have extracted from English *Wireless World* magazines of 1914 and 1915, and I hope these small pieces demonstrate the feeling of development, progress and humour taking place 73 years ago.

"SPARKS" FROM THE TROOPS

That the London electrical engineers are far from being depressed is evident from the cheery tone of their publication, *The Eclipse*, which contains some very amusing matter. The following conundrums, perhaps of a highly technical nature, are culled from the back page of the journal in question —

Where did the Ammeter? In the Magnetic Field.

Why do the British Forces offer such good resistance? Because they are OHMS.

Why did the Voltage? Because it was told it would Die-in-a-mo.

"You know we are leading a shocking life," remarked the medical coil to his partner, the dry cell.

"Yes, I think we shall have to rest soon," replied the dry cell. "I'm beginning to feel a bit run down."

WIRELESS OPERATORS MUST NOT SWEAR

A wireless operator in Massachusetts was recently admonished by the United States Department of Commerce for swearing by wireless, and warned that his licence would be revoked if he were not more careful with his language.

A PRIMITIVE WIRELESS TELEPHONE

People who spend their time in belittling great inventions, attributing great inventions to any but the proper source, have now the chance of their life with regard to the wireless telephone. The researches of Mr Marconi and other scientists in this direction will in future go for naught. The *African Mail* of recent date gives a short account of the interesting experiences of Mr James Chaplin, of the American Museum of Natural History, in his recent six years' expedition along the banks of the Congo. Among the many wonderful stories of native and animal life that Mr Chaplin has brought back with him, not the least curious is his account of the "wireless telephone" used by the natives in the forest country of the Congo. It is a wonderfully efficient system, and is quite unlike the Morse or any other that we use. The natives make noises on drums which will carry quite 10 miles, these noises resembling the sounds of words in their own language.

ARCHAEOLOGICAL RESEARCH

THE GREEK: "They have found iron wires at Athens in excavation among ancient ruins, proving that the ancient Greeks understood telegraphy."

THE EGYPTIAN: "But at Cairo it is more remarkable. They have made excavations and found nothing!"

THE GREEK: "Found nothing! What does that prove?"

THE EGYPTIAN: "Why, that the ancient Egyptians understood wireless telegraphy!"

—From *Le Rire*

SOME WIRELESS APPARATUS

A spark gap which gives good results for small power is shown in Figure 1. It consists of a piece of aluminium rod 3/16 inch diameter riveted on to a piece of brass strip 1/32 inch thick.

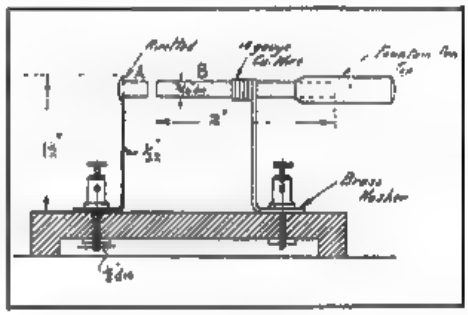


Figure 1.

The other portion has five turns of about 14 gauge copper wire wound round it. The effect of this is to allow B to be advanced to or retarded from, A by a screwing action. The end of the wire is brought down and soldered on to a brass washer. Terminals are used to fasten A and B on to the ebonite base. An old fountain-pen top is filled with molten sealing wax and stuck on the end of B.

GIBSOR

TELEGRAPHISTS REQUIRED AS WIRELESS TELEGRAPHISTS ON BOARD SHIP

AGE 18-25

Applicants should be able to send and receive not less than 18 to 20 words per minute. Selected applicants will be paid 17/6 per week during short periods of training. Apply giving particulars of past experience, quoting this advertisement to Traffic Manager, The Marconi International Marine Communication Company, Ltd. Marconi House, Strand, London, WC.

A MARCONIGRAM

A TOUCH on the keys, a crackle,
A glow in the aerial wire,
Then, cleaving the night
With the speed of light,
Issued a message — in fire!

Next, as a buff "Marconi,"
It reached Miss Eleanor Shadd,
'Twas very concise,
But extremely nice,
And Eleanor's heart was glad.

Quickly, Eleanor, quickly!
Time and the hour slip by;
The poor little page
Has waited an age
For the expected reply

What was this urgent business?
"Sparks" 's inclined to guess,
The 'phone at his ear,
He is ready to swear,
n dashes and dots spelt — "YES!"

DOUGLAS R P COATS

WIRELESS MUSIC AT SEA

The *Adelaide Advertiser* recently contained an account of the novel experience of the wireless operators on board the American steamer *Port Kembla*, which arrived at Fremantle, WA, from New York early in April. Shortly after the steamer left New York, one of her operators, who had the receivers to his ears, was surprised to hear a human voice come from his instrument. Listening intently he was able to hear the voice call "Hullo Philadelphia," to which the answer came "Hullo Boston," followed by a further call from the first station "Stand by for a little music."

After a slight interval the grating sound of a gramaphone came to his ears followed by the rendering of the song "Sister Susie Sewing Socks for Sailors." The operator could hear each note as plainly as if the gramaphone were in the wireless room.

On the arrival of the *Port Kembla* at Bermuda, it was learned that other operators had experienced the same musical treat, and it was eventually ascertained that the reason for it was that some experiments were being carried out by a wireless telephone at Boston.

EXPEDITION

An unique feature of the expedition undertaken by Sir Ernest Shackleton to cross the Antarctic Continent is the arrangement made for a service of news messages to be despatched by the Port Stanley (Falkland Islands) station. This is made possible by the loan by the Marconi Company to the expedition of a complete installation for the reception and transmission of messages, and by the action of the Falkland Islands Government in arranging the service clear of all charges.

It can easily be imagined the source of pleasure this will be to the expedition, who are now wintering somewhere in the vicinity of the Weddell Sea. The installation is in charge of Mr R Jones, physicist attached to the party, who is to transfer the set to a shore station in the South. A directional aerial is to be erected towards Port Stanley.

AMATEURS IN THE ANTIPODES

About four years ago a number of wireless enthusiasts in New South Wales gathered together for the purpose of interchanging ideas concerning wireless telegraphy. The outcome of this was the formation, in 1910, of the "Wireless Institute of New South Wales," which claims to be the first amateur wireless body to be established in the British Empire. As far as we are aware, this claim is justified, for we have not heard of the existence of a wireless society in any part of the Empire prior to 1910. We are informed by the hon secretary, Mr Malcolm Perry, that there are about 400 experimenters in New South Wales and that wireless is going ahead wonderfully there. New South Wales amateurs claim to cover longer distances than amateurs in England. Mr Perry states in his letter to us that "Our amateurs here seem to do very long distances as compared with what we read about the amateurs of England. It is a common occurrence for them to do 30 miles overland with a half-inch motor coil. We tune our stations with a Marconi wave-meter, which we find very efficient." The New South Wales Institute would like to enter into correspondence with wireless societies of Great Britain. The address of the hon secretary is Box 2, King Street, Sydney NSW.

SIGNOR MARCONI A SENATOR

In the Senate on March 17th Signor Guglielmo Marconi was introduced to the House as a new Senator with the customary formalities. He was received with long and enthusiastic applause, in which the public in the gallery joined.

SUMMER QSO PARTY — 1987

The 1987 Summer QSO Party on 20 metres was held in rather poor conditions, nevertheless enticed a total of 50 members of the VK and ZL clubs on to the band, 18 of them from Victoria.

As usual, skip had a serious effect on adjacent state contacts, but many QSO totals in the 20s were recorded. Despite the difficulties, all those who sent in logs considered the three hour interlude as time well spent.

SCORES

CALL SIGN	MODE	QSOs	AREA	TOTAL
VK5SJ	SSB	29	10	1450
VK3SM	SSB	23	10	1150
VK3JA	CW/SSB	24	9	1080
VK2RJ	SSB	25	8	1000
VK3VF	SSB	19	9	855
VK3LC	SSB	21	8	840
VK3XF	CW/SSB	20	8	800
VK3GI	SSB	17	9	765
VK3KF	CW/SSB	21	7	735
VK2ABC	SSB	16	8	640
VK3KS	CW/SSB	20	6	600
VK3XB	CW/SSB	20	6	600
VK6CF	SSB	24	5	600
W6GTI	CW/SSB	19	6	570
VK2OH	SSB	14	7	490
VK7BJ	SSB	14	7	490
VK3ZC	CW	11	5	275
VK7RY	CW/SSB	9	6	270
VK3YW	CW/SSB	6	6	180
VK5KV	SSB	7	5	175
VK5RK	SSB	5	3	75
ZL3BJ				780
ZL2AB				630
ZL2AT				450
ZL1OV				320
ZL3AY				320
ZL2AKY				225

Note the dates of the Winter Parties — August 3 on 40 metres; August 10 on 80 metres. Both Parties are from 0800 to 1100 UTC. Details in OTN Magazine.

John Tutton VK3ZC

Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West Launceston, Tas. 7250

Today, I have had several interruptions whilst writing this column, and I have wondered to myself whether the June column would ever meet the deadline. We have had some renovations done at our house, so it was impossible to get peace and quiet in which to concentrate. Easter came around, which meant distant relatives arrive at your doorstep, wanting to check on how the newlyweds are coping. Then you think that you would have a clear go, forgetting that the National Brass Band Championships are in town and that one has to go down and watch the street marching in the city. But the last straw was when 'Tiddles,' our six-month tabby cat had to be taken to the vet, after being severely beaten up by the neighbour's ginger tom.

So, now let us concentrate on this month's news. As predicted in this column, the "Christian Science Monitor" has purchased KYOI in Saipan, and will be linking up, via satellite, with their parent station in Maine, WCSN. They are reportedly also going to acquire a second transmitter for their Saipan site. Programming on KYOI should be radically altered in a few months, and will be news and information, with religious programming on Sundays, just as WCSN.

The World Service of the 'Christian Science Monitor' commenced on April 1, from a site close to Bangor, Maine. Studios are in Boston, Massachusetts and the station is wholly owned by the influential and respected Boston newspaper. The program-makers are utilising their correspondents throughout the world to contribute to their news output and are not relying on network newscasts as are the other private Stateside stations. I have not space to print the complete schedule but have found that it is best heard on 7.365 MHz, from 0600 to 0800 UTC. Programs are in English.

Another station and country also came on-air in mid-March. It is Radio WSZO in the Marshall Islands and has been logged clearly on 4.940 MHz in our evening hours. Programming is primarily in Majuro, a local language, but English newscasts have reported to been heard, plus the sender signs off at 1005 in English. From 1900 to 0530, WCZO is on 6.170 MHz and on 4.940 MHz from 0530 to 1005 sign-off. This station is in the Federated States of Micronesia, a former US Trust Territory. Another ex-territory near the Philippines is now known as Palau, and some are wondering whether they too will make it onto shortwave in view of the tremendous interest amongst DXers to the appearance of WSZO. Incidentally, WSZO is utilising a 10 kW NEC sender.

Well, the ILG arrived for the M87 quarter in mid-April, and it is not surprising as the publishers are rather annoyed because of the unofficial six broadcasting periods, the two extra periods which accommodate daylight saving in Europe. This plays havoc with frequency planners, not only at stations, but also to ILG monitors.

Consequently, not unexpectedly, the editors have wisely decided to put back publication just a few weeks to when scheduling settles. The "ILG" will still be issued four times a year – in April, May, October and November. I still find it indispensable and much easier to use than the WRTH.

Earlier this year, there was another WARC in Geneva, this time to get some agreement in High Frequency Broadcasting Scheduling. The big question was jamming and the conference bogged down on this point and deferred coming to a decision on resolution of this thorny question until 1992. So the present chaotic situation will continue. However, there were two interesting decisions at WARC 87. One was that the introduction of single sideband by broadcasters would be gradually phased in with 2015 being the target date for full SSB broadcasts. Presently many broadcasters have been experimenting with SSB reduced carrier, which is compatible on many, if not the majority of shortwave receivers throughout the world. DW and Radio Sweden have both experimented with USB for many years and results were encouraging. The Soviets have employed SSB HF Feeders for over 20 years, so have, until recently, the Voice of America, Radio Australia and Radio Beijing. One SSB HF feeder is still the only reliable way to hear Radio Liberty/Free Europe, which is under constant jamming on all of its allocated channels.

The other interesting resolution that was unanimously carried is of particular interest to Intruder Watch monitors as well as to long-suffering 40 metre operators. It is that broadcasters will, in future, adhere to 7.1 to 7.0 MHz amateur allocation and that it should remain exclusively amateur. The only known non-ITU member who broadcasts still within our exclusive allocation is Albania, whose station, Radio Tirana, is on 7.065, 7.090 and 7.090 MHz. All other broadcasters are now supposed to be out of 7.0 to 7.1 MHz. This will probably mean other utility services will gradually creep within our allocation, as is already happening.

Well, I have finally cracked the North American MW Wall. On April 2, I heard several DX stations coming through on MW from Asia and thought that I would try and see if I could hear US stations. 1540 was free from the heterodyne of the New Zealand commercial on 1539 and at 1205 I did hear an American with ABC news, thinking it was a known Hawaiian, but the call sign given was KNBS. This turns out to be a Californian five kilowatt station in Capitola. This station was confirmed to me by a logging from a Queensland listener in the *DX Post* — the monthly journal of the Southern Cross DX Club of the same sender.

There was another American station on 1.480 MHz at 1213, but there was much splatter from nearby Australian stations. I think the call was KYOR, but I am not even 50 percent sure if that is correct. Now that I've broken the barrier I am hoping to hear more North American MW stations. Incidentally, my receiving equipment is an R70 to a G5RV. The antenna should be connected to the high impedance input for maximum effect on MW. I do not have a loop antenna, but I'm hopeful of borrowing a commercial MW loop to really have a go at getting Stateside on MW!

HF conditions dramatically improved mid-April, which is a sure sign that we have turned the corner. I was pleasantly surprised to hear stations coming through well on 13 metres the other night. The latest count in mid-April was 46, yet this is expected to vary quite a bit, so don't be surprised if there are low spots again.

While we are on the South Pacific, it has recently been reported that Radio Rhema, a New Zealand Christian radio network, plans to open a MW and FM station in Tonga, with the future possibility of HF broadcasts from the same site. If this is so, it will mean another South Pacific nation for DXers and SWLs.

Well, that is all for June. Don't forget to tune over the 49 metre band around 0200 UTC for the Europeans coming from across the Antarctic.

–73 de Robin VK7RH
er

CORRECTIONS

Please amend the following corrections to "An Introduction to AX.25 Link-Layer Protocol" which appeared in March AR.

1. Page 8 column 1, last paragraph of *Digipeating* should read:

— until such time that a Network Layer protocol for level 3 is implemented. Once a true level 3 Networking protocol is in use, digipeating links will gradually be phased out.

2. page 8, figure 3 should read

A stream IO Link State is: CONNECTED to
— VK6AAA
B stream
— Link State is: CONNECTED to VK6DDO P
C stream
— Link State is: DISCONNECTED
D stream
— Link State is: CONNECTED to VK6CCC via VK6BBB

I stream
— Link State is: CONNECTED to VK6EEE
J stream
— Link State is: CONNECT in progress

3. Page 8, column 1 and 2. *Multi-Connect Operation* should read

STREAMSWitch $7C (:)

4. Page 8, column 2, third sentence of paragraph commencing:
The STREAMCAll On option enables the TNC-2 user should read:

Notice that the STREAMSWitch character and stream identifier ":B" without the ":" displayed immediately following. . . (All occurrences of "B" and "B:" should be ":B".

5. Page 9, Glossary should read:
HDLC instead of HGLC.

Please amend your copy.

IONOSPHERICS FROM VK2QL

Some readers may not be aware that the values of all indices are provisional. Final values are not available for several months. The A index given on the weekly VK2WI Broadcasts is for three days prior to the broadcast date. If you regularly listen to WWV you will referring back to the index of WWV for the same date as IPS there will often be a slight difference. In addition WWV gives a K index. From a chart in the possession of VK2QL, an A index of 46 will equal within the region of a K index of five which is very disturbed conditions. Those who have kept a record of the A index given on the broadcasts will not necessarily agree with that of the summary.

The monthly averages for February were 10 cm flux 71.5. Sunspot number 4, A index 9.1; I index 13.9/ No flares were observed. Solar activity was low. (See Solar Geophysical Summary, this issue for more details).

The regions visible during the month appear to have been new cycle regions. This strengthens the views we have passed solar minimum.

The table of A index value to propegation levels of magnetic disturbances are

A INDEX VALUE	DESCRIPTION
0 to 7	Quiet
8 to 15	Unsettled
16 to 24	Active
25 to 35	Minor Storm
36 and above	Major Storm

The I index is a measure of the average level of the ionospheric critical frequencies available on a particular day. The higher the value of the I index, the higher the ionospheric critical, and MUF of HF circuits for that day. The I index is based on data from Australian ionospheric stations and so is most applicable to HF circuits with reflection points in the Australian region.

Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

DXCC UPDATES — 1986

This does not include those with scores of 270 and above, which were published last month

Date	Name & Call	Phone	CW	Open	RTTY
Jan	S E Molen VK2SG	256/16	138/10		159/1
	John Kelleher VK3DP			104	
	John Heine VK3JF		226/14		
	Keith Schleicher VK4KS		129/11		
Feb	Jim Swan VK2BQS	160		165	
Mar	Ken Jewell VK3AKK		205/1		
	Bob Searle VK3CSR	253/1			
	Les Catford VK5LC	264/11			
Apr	Gerry Butler VK3GB	268/16			
	Kim Wilson VK3CYL	268/3		268/3	
May	Gray Taylor VK4OH	212			
Jun	F H Macklin VK1ZL		217		
	John Heine VK3JF		227/14		
	Tom Dowling VK4OD			163/1	
	Poppy Bradshaw VK6YF	203			
Jul	Gwen Tilson VK3DYL	240			
Sep	Bert Williams VK5BO	206/1		258/34	
Oct	Ian Thomas VK3DNC			152	
Nov	Tom Aubrey VK6EE	266			
Dec	John Kelleher [illegible]			153	

DXCC UPDATES — 1987

In future, updates will be published monthly, for all DXCC holders. The complete list of those with scores of 270 and above will continue to be published annually.

Date	Name & Call	Phone	CW	Open	RTTY
Jan	Bill Hemper VK4LC	306/35			
	Brian Lavender VK4LV		184/6		
Mar	F H Macklin VK1ZL	228			
	John Kelleher [illegible]			175	
	John Heine VK3JF		227/15	311/24	
	Bert Williams VK5BO	212/1		261/34	
	Neil Penfold [illegible]	307/10			

AWARDS ISSUED RECENTLY

Worked All VK Call Areas (VHF)
28 S J Hutcheon VK4ZSH (6 metres)

WORKED BERLIN WEST AWARD (WBW)

To encourage the activity of amateur radio stations in the area of Berlin-West the Ortsverband Schoeneberg DOK DO5 of the DARC is issuing the WBW (Worked Berlin West) Diploma.

The WBW is available to all licensed radio amateur stations (SWLs on a 'heard' basis) fulfilling the following conditions.

For the WBW, count confirmed QSOs with licensed radio amateur stations working from the different 'Postal Delivery Districts' (PDD) of Berlin-West. The PDD is a two-digit number following the name of the city of Berlin as apart of the address, printed on the QSL card. For example: D-1000 Berlin 37 denotes the PDD 37

The WBW is issued in two categories:

Category GENERAL — QSOs in all allowed classes of emission.
Category 2 x CW — All QSOs in two-way CW.

The WBW is issued in three classes:

CLASS C (Champion) — 30 PDDs confirmed.
CLASS S (Senior) — 20 PDDs confirmed.
CLASS J (Junior) — 10 PDDs confirmed.

All QSOs after January 1, 1970, are valid for the WBW. No charge will be claimed for the WBW Class Champion in either category, otherwise the fee for the WBW in either category is DM5 or five IRCs. Stickers are available for all classes in the same category. For the first application there will be no charge for the sticker, for later applications the fee is DM1 or one IRC. For Class Champion the sticker will be free of charge

QSL cards are not required but a GCR list should be submitted, certified by two other licensed amateurs, and signed by the applicant. Include data of call sign, date, QTR, class of emission and PDD. The GCR list and fee should be sent to the WBW Award Manager, Detlef G Liebe DH7ACG, Zinnowweg 4, D-1000 Berlin 37, West Germany, FRG.

WIA 75 AWARD RECIPIENT UPDATES

Cert No 706: Peter Nilon VK3CPN
Cert No 707: Buntoro Njoto Hartanto YC3PXF
Cert No 708: Paulus Hermawan YB3HM
Cert No 709: Achmad Somi YB3GX
Cert No 710: Mhd Ishak Delasan YC7BBI
Cert No 711: Iman Sujudi YB2IA

TEN TEN INTERNATIONAL NET IN "Twenty Eight" Chapter

In keeping with the "Twenty Eight" theme, the Chapter has devised their award program to keep within the framework of "28", "10", "10 x 10" or multiples/combinations thereof.

BASIC AWARD: (Western Third) requires 28 points including 1C or 1L (VK6 station) or IQ.
Stickers to Basic
"North" . 56 points
"East" . . . 84 points
"South" . . 112 points
"West" . . . 140 points

Each worth one point.

1st u/g "Wildflower-State" requires . . . 280 points
(including 2C/L or 3HC or IQ)
2nd u/g "Perth-on-the-Swan" requires . 420 points
3rd u/g "Kings Park" requires . 560 points
4th u/g "Rottnest Island" requires . 784 points
5th u/g "Twenty Eight Parrot"
Maintain a QSO of at least 28.560 minutes (Net Frequency) with another "Parrot" (holder of this award), the other station ('Parrot') to confirm QSO with CM

(IQ Basic)

Stickers to "Twenty Eight Parrot"
'10x10' — worked 10 stations with 10 or more points
'28x10' — worked 28 stations with 10 or more points
'10x28' — worked 10 stations with 28 or more points
'28x28' — worked 28 stations with 28 or more points

Each worth one point
(IQ Basic + 1st u/g)

6th u/g "VIP" will be issued with 1st sticker (900 points)
Stickers for each 100 points to 2600
(each sticker worth one point)
For the "Basic" Award
CHARTER MEMBERS . . (C) are worth an extra five points
'FIRST STATE' COUNTRY, PROVINCE, OBLAST . . (FS etc) are worth four points
HONORARY CHARTER MEMBERS (HC) are worth three points
OVERSEAS STATIONS . . (DX) are worth two points
AUSTRALIA (except VK6) . (A) are worth one point
LOCAL (VK6) (L) are worth zero points
(However, they may be needed for 'Basic' or 1st u/g)
"FIRST STATE" etc will also be used for u/gs but not for stickers
C/HC cannot be FS etc. HC given at discretion of CM/CH
NOTE.
1. Station can be worked ONCE ONLY for Basic and stickers to Basic.
2. Stations can be worked once again for 1st and 2nd u/g (If the station has not been worked before, can be worked a second time provided there was at least 24 hours between QSOs).
3. Stations may qualify for the "Twenty Eight Parrot" at any time. However, it will not be issued until after the 4th u/g, and will be sent with it.
4. "First Country", "First State" etc. apply to Basic and all u/g
COST: $2 each Award plus $1 for postage (one IRC exchanges for $A.50). Except "Twenty Eight Parrot" which will be free. Stickers to basic: 25 cents each plus SASE or sent DX with next u/g. Stickers to "Twenty Eight Parrot and "VIP" to be advised later.

When applying for these awards, always include
Call sign of stations worked, 10x No, Date and points claimed.

Proof of current membership also required.

CM/CH "Twenty Eight" Chapter, Dave Handscomb, PO Box 1073, Subiaco, WA. 6008.

Magazine Review

Roy Hartkopf VK3AOH
34 Toolangi Road, Alphington, Vic. 3087

G General C Constructional P Practical without detailed constructional information T Theoretical N Of particular interest to the Novice X Computer program

BREAK IN, January 1987. QRP issue (G C N)
QST, February 1987. Radio Frequency Chokes (C N). Product Review Index (G). Monolithic Wideband Amplifiers (P).
RADIO COMMUNICATION, March 1987. Commercial Equipment — readers' survey (G) Annual General Meeting (G) 1200 MHz Oscillator (C)
RADIO COMMUNICATION, April 1987. Long Yagis (G). FET Dip Oscillator (P)
CQ, January 1987. Low Cost Dip Meter (N) Antennas and Guy Wires (P). Old Radio Gear (G).
OSCAR NEWS, March 1987. Official Journal of AMSAT-UK with news of satellites, equipment etc. (G)
WORLDRADIO, February 1987. General information on amateurs, equipment, international news, maritime mobile, etc (G).

Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW. 2868

JAPANESE VISITORS FOR JOAN VK3BJB

I have received another letter from Joan VK3BJB, adding a further chapter to the story of her Japanese language lessons (May AR)

Five of the six-man crew of the yacht, *Okira 7*, in Melbourne for the Melbourne-Osaka Yacht Race, found they had time to spare before the commencement of the race, and decided to pay Joan a surprise visit to personally thank her for relaying messages to their families in Japan during the two month voyage to Australia.

They had no idea of Joan's address, but did have a telephone number, given to them by the Okera Net Controller. What they did not know was that the telephone number was incorrect, and was actually a disconnected Wentworth number.

Meanwhile, the net controller, JE8AAQ, realising his mistake kept regular scheds with Joan every hour to see if the "surprise" visitors had arrived safely, becoming increasingly concerned as the hours went by with no sign of them. Finally Joan decided to check the hotels and motels in Mildura, reasoning that they would need somewhere to stay overnight. At the sixth motel contacted she located the missing visitors, who could not work out how Joan knew they were in Mildura, or how she managed to find them.

Joan and her family subsequently travelled to Melbourne on March 20, to meet the Japanese yacht crews and attend the farewell party, given by the Sandringham Yacht Club, as guests of the Japanese entrants.

Joan has assisted other Japanese visitors to Australia with travel plans. She says; 'Many Japanese people have no idea how big Australia is and how long it takes to travel from one place to another.'

Not only Japanese call on Joan for assistance. She was recently instrumental in making a contact with Sweden for a Swedish girl in Mildura for the grape picking season.

As Joan says; "Never a dull moment in this place."

ANOTHER ALARA?

Following an article about ALARA written for *73* magazine by Jim Joyce VK3YJ, the following letter was receive by him

"A friend of mine gave me an article from *Amateur Radio* (February 1987, page 94) about the Australian Ladies Amateur Radio Association (ALARA). I am involved in a different ALARA organisation.

'In my case, ALARA stands for As Low As is Reasonably Achievable and is a world-wide group that exists in Nuclear Power Plants. Our aim is to maintain plant workers exposure to radiation. ALARA. We do not have our own song but, we do have stickers that all at Pilgrim Station wear on our hard hats — enclosed is one of them. As the sticker states "Time, Distance and Shielding" are important ALARA principles since they all play a big role in exposure reduction.

"You may no longer have the America's Cup but, any country with a great ALARA group is fine by me.

'Sincerely,

'Patty Robinson."

The Other ARRL Logo.

THE LADY WITH THE MORSE CODE LAMP

Judy VK5BYL, came across the following article while looking through some old magazines.

"She waved her way to happiness

"Ill in bed, a girl from a Tasmanian sheep station waved to passing ships and became known to seamen all over the world. ..by Vernon Black.

"It took a Dutch sailor to bring to my notice the unique hobby of Kathleen Cashion, of East Arm, on the River Tamar, Tasmania. He was Commander Klass Tiel, of the *Admiral Crinyssen*, and at first I wondered what on earth he was so excited about. I couldn't see anything unusual in a wave to a passing ship.

"The Commander, however, was delighted to receive a message from a young woman as his famous little destroyer steamed up the Tamar soon after the war ended.

"Soon I became as interested as the Commander, and investigations unfolded an unusual and romantic story. I discovered that Kathleen Cashion never missed sending signals to passing ships, and had made friends in many parts of the world by this means.

"All this started about 15 years ago when the Cashion family first moved to East Arm. Kathleen was ill at the time, and used to wave to the ships as they went by, up and down the river. The officers and men on board used to wave back to her, and soon began to send her messages with flags and lights in Morse code.

"It was an opportunity for her to learn flag signalling and Morse code while she was sick, and she was soon able to wave a "good morning" or "good afternoon" to a ship.

"After a short while she wouldn't let a ship go by without sending some form of greeting, and the men in the ships always replied to her.

"When a ship ran aground near the Cashion property some years ago, the authorities installed a light on the point, and knowing of Kathleen's interest in ships, they asked her to be caretaker of the light. Of course she said yes and since then has had charge of Sheeptail Light, commonly known to seamen familiar with the river as "Kathleen's Light."

"During the war when signals to and from ships were banned, Kathleen's messages got through, because the Navy granted her special permission to continue her self-made job.

"Imagine the astonishment of the crew of a Norwegian freighter when they entered the river during the war and found Kathleen using a Morse lamp! Many other ships, including visiting British submarines, Dutch destroyers, and overseas cargo ships were welcomed — and surprised — by her messages.

"There's quite a social aspect to Kathleen's waving — whenever she visits Launceston she is entertained on board various ships and she receives letters and presents from seamen in all parts of the world. She's even had proposals of marriage in Morse code but prefers to remain sweetheart to all sailors and wife to none."

—From *Women* September 19, 1940

Judy wonders " ... if Kathleen eventually married a sailor or not, and whether she became interested in amateur radio." Judy suggests that perhaps some VK7s might be able to find out a little more about Kathleen.

So, how about it, VK7s? Is there anyone in Tasmania who knows what became of Kathleen Cashion?

Judy does the Slow Morse sessions once a week, a task she enjoys. At the time of writing she was planning to be active in the John Moyle Contest using "pedal power."

We would be interested to know how many contacts you made, Judy, not to mention how much slimmer you will have become with all that exercise!

WARO CONTEST

A number of ALARA members participated in the special Silver Jubilee Thelma Souper Memorial Contest held on April 4 and 5. Conditions on 80 metres were very good, and the contest proved most enjoyable with some high scoring being achieved.

Many ALARA members have qualified for the attractive Silver Jubilee Award, issued for WARO contacts during the month of March.

WARO had its beginning in March 1962 with a membership of seven. By January 1987, the number had grown to 218.

Silver Jubilee congratulation to our sister YLs across the Tasman.

GET-TOGETHER

Plans for the September ALARA Get-Together are well under way. Further to the details already given in March AR

Registration Fee — $20 per head to cover meals

Children —

Up to five years — $5 per head

Five to 10 years — $10 per head

10 to 15 years — $15 per head.

Over 15 years — $20 per head.

Registrations and Inquiries to Marla VK5BMT

NEW MEMBERS

It is very pleasing to see a steady flow of DX YLs joining or being sponsored into ALARA, and the continuing growth of the VK membership.

A warm welcome to Vicki VK5FK, Dawn ZL2AGX, Tuti YD0TTK, and Mimi ZS5YO.

That's all for this month.

—73/33, Joy VK2EBX

Club Corner

OXLEY REGION AMATEUR RADIO CLUB
FIELD DAY
PORT MACQUARIE

June 6 and 7
Details PO Box 712, Port Macquarie, NSW 2444
or phone Lester O'Connell
(065) 83 1100 (BH)

THE TWENTY EIGHT CHAPTER

We are a group of amateur radio operators.

As many are aware, radio propagation varies among other factors, within a 10-11 year cycle, according to the activity of Sunspots, hence known as the "Sunspot Cycle." At the moment we are at the 'low' of Cycle 21 and about to enter Cycle 22. As a result, propagation will soon begin to improve again, especially on the 28 MHz (10 metre) band, which is most affected by the Sunspot Cycle.

In 1962, a group of amateurs in America formed an organisation to promote activity on this band, the organisation has come to be known as *Ten-Ten International*.

All the members of our group belong to 'Ten-Ten' and the WIA, and with the increasing activity anticipated, we see this as an excellent opportunity to publicise the State of Western Australia, and, in particular, the City of Perth and surrounding districts.

To that end we are planning to form the first Chapter of 'Ten-Ten' in WA (there have been a number of chapters started in the Eastern States as well as about 250 throughout the world, but never before has there been a 'Ten- Ten' Chapter in WA).

We plan to call our Chapter *The Twenty Eight Chapter* — the name being inspired by reading that,

Twenty eight parrots, so named because of the resemblance of their call to the words 'twenty eight' are the most common parrots in the neighbourhood of Perth (WA). Unlike most Australian parrots, they are bold, inquisitive birds, and is alarmed will sit overhead and call loudly instead of flying away. This will often bring in large numbers from nearby and all join in the commotion

—if you have ever listened to a "Ten-Ten" net you will understand exactly why we think this is an ideal name for our Chapter.

See the Awards Column of this issue of AR for Certificates offered by the Chapter.

The Chapter Net is held each Sunday on 28.560 MHz at 0230 UTC.

For further information join in on the net or contact Dave Handscomb VK6ATE (ex-VK6NHD), PO Box 1073, Subiaco, WA. 6008.

"Rig is 'drifting' a bit here, OM!"
—VK2COP

BEACONS AND REPEATERS

Tim Mills VK2ZTM
FTAC BEACON CO-ORDINATOR

In the last issue, an indication was given into the establishment, by a club or group, of a beacon or repeater facility.

This time I would like to list some of the subjects that need to be addressed.

CAN IT BE JUSTIFIED?

Many think it would be nice to have the facility but may give little thought to the long term involvement. Besides the initial financial outlay on the system, there is the ongoing cost of license, power, insurance, maintenance and cost involved with the site. There is also the personal required to maintain the system.

Is you region already served by a suitable system? Will it continue to receive the use after the first round of button pushing a new system?

RUNNING COSTS

A well engineered system should not require a site visit more than every few months. (Usually to check the batteries). If it is operated within its commercial specifications there should be little wear and tear. If you do not receive free power from the site host, then extra funding is required from your group funds.

FREQUENCY DETERMINATION

The central data bank maintained by FTAC now greatly assists the State technical committee and the applicant group work out the most suitable channel available. All the major bands have now been planned for both beacons and repeaters, so the general framework exists.

THE SITE

This is often hard to find as most RF hills are already occupied. (Or if you intend a two metre system there is already a pager there or nearby). It is most important that (written) permission is obtained prior to installation. It can be embarrassing to be caught. For security purposes to both yourselves and your host, do not publicise its exact whereabouts. There are some anti-social types about.

THE EQUIPMENT

Work around reliable equipment that does not need a visit every other day to read,ust. Elevated sites are hard on antennas and coaxial installations, so either construct them well or obtain good commercial ones. Make them blend with the other site antennas so they are hard to pick out. This improves your systems security. Make sure it is RF clean equipment wise, as it often has to live with other systems.

STAND ALONE OR LINKED?

Many country regions do not have the amateur population to justify the time, effort and expense. In these cases and with other established systems in a similar geographical region there may be benefit in being linked to provide increased coverage and additional users.

WHICH BAND?

While most think of two metres for repeaters the 70 cm band should not be overlooked. In much of the eastern part of Australia, the two metre band has become saturated. The 10, six and 23 (cm) bands also offer facilities but with less possible users. These should be considered, more as supplementary systems after some area coverage has been achieved with two and 70.

HOW DOES ONE ESTABLISH A SYSTEM?

In the first instant after the group decides that they would like to establish a facility they should contact their State Repeater Committee for advice on what channels are available and if other systems are being planned.

In these notes over the next few issues I will expand on some of the above points.

In closing, may I remind the various groups to keep FTAC advised and updated about your system so that the data bank can be maintained for the benefit of all. This will also ensure accuracy in the Call Book listings.

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

Well, here we are in winter, and the year seems to be flying by. Listening on HF reveals a mixed bag, and I think it is a question of being at the right spot at the right time. It is disappointing to hear scheds being conducted on or around 14.100 MHz, the International Beacon Frequency, and makes it difficult to check propagation through SSB signals.

Those readers who have AMTOR facilities might like to have a look around 14.104 MHz and up, and let me know if they learn anything of the origins of the signals. Some of them are thought to be coming from Auckland, New Zealand, and the IW in ZL are looking into that from their end. Some confirmatory bearings from VK would be helpful.

Good reports were received for February from VK1s HF, WX, VK2s CS, SG, Arthur Bradford, VK3s AMD, XB, VK4s AKX, BG, BHJ, BTW, DA, KHZ, OD; VK5s AF, GZ, TL, VK6s JQ, RO, XZ, VK7RH, VK8s HA, JF and VK9NI.

Some spill-over observed into the 40 metre amateur band from USA operators on the "MARS" network. Bit disappointing. .

Congratulations to the DARC Monitoring System, in West Germany, for their 15th Anniversary. Their Intruder Watch (Bandwacht) was started in 1972 by Rudolf Klein DL2DZ, and is still very active.

Some encouraging news, again from West Germany, concerns the WARC for the planning of the HF bands allocated to the broadcasting services in Geneva, 1987. Resolution No 641 resolves that "the broadcasting service shall be prohibited from the band 7.0 to 7.1 MHz and that broadcasting stations operating on frequencies in this band shall cease such operation" and urges that "the Administrations responsible for the broadcasting stations operating on frequencies in this segment to take action so that such operation ceases immediately" ! The ITU Secretary General is requested to bring the resolution to the attention of the Administrations. Of course, this has been tried before, but there is a lot to be gained from the exercise, and certainly nothing to be lost!

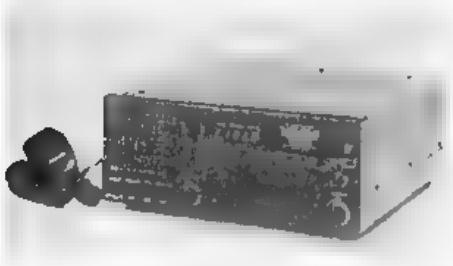
So that's about all I have for this month — see you next month, and keep the IW in mind when you hear that next intruder (and you will!)

MARINE RADIO

The Icom M-700, a 48 channel HF SSB/AM marine transceiver, can transmit and receive on any authorised marine channel from 2 to 23 MHz with up to 150 watts output (selectable outputs — 20, 60 or 150 watts).

Ideally suited for small craft the M-700 can also be programmed to receive-only on any frequency from 1.6 to 24 MHz, providing access to facilities such as weather FAX (weather chart facsimile transmissions on 5.100 MHz), local standard time (4.500, 7.500 and 12.000 MHz), news broadcasts or International (UTC) time and Pacific areas weather (10 and 15 MHz).

Allocation of frequencies to the 48 simplex and semi-duplex memory channels can be made according to individual requirements or Icom can supply the M-700 fitted with all popular marine frequencies.



Frequency selection is controlled by two rotary channel switches — the first controls channel group selection with three channel groups in logical order according to purpose and a fourth position providing instant emergency access to the 2.182 MHz International Safety and Calling Frequency. The second controls selection of 16 frequencies within each logical channel group.

Because the output of some marine transceivers does not always exactly match the specified marine channels, the M-700 is fitted with a received signal 'clarifier' to adjust the pitch of SSB signals, making off-frequency signals easier to understand.

Exacting specifications ensure that the unit is locked on its operating frequencies and electronic frequency programming of the M-700 by any authorised technician means it will always keep abreast with changing frequency allocations.

A voice-activated squelch allows listening on favourite marine channels without the pop and crackle of less sophisticated HF transceivers, whilst a built-in noise blanker eliminates annoying static and electrical impulse noise from received signals. The noise-cancelling microphone allows clear, noise-free transmissions even in rough weather. An optional telephone-style handset allows privacy of conversations when needed.

The M-700 comes with its own heavy-duty mounting bracket and is compatible with most marine and general purpose antenna tuners. Used with the Icom AT-120 automatic antenna tuner and a wire antenna or backstay, the unit can usually change from band to band in less than three seconds.

For more information contact your nearest authorised Icom dealer or Icom Australia, 7 Duke Street, Windsor, Vic. 3181. Telephone (03) 529 7582.

IPS USER TRAINING COURSES

To increase the value of their services, IPS Radio and Space Services are offering users a one-day training course. The course consists of three lectures, each of which is followed by a question/answer session. Topics included in each lecture are:

Lecture 1 — Scientific Background to IPS Predictions

- The ionosphere and its formation
- Reflection and absorption of radio waves
- Ionospheric variations
- Mapping and predicting the ionosphere

Lecture 2 — HF Radio Propagation and Prediction Formats

- Oblique propagation
- IPS predictions and formats

A R Showcase

Short-Term Disturbances Caused by the Sun

- The sun-earth environment
- The main types of solar activity
- The terrestrial effects of solar activity
- Warning services provided by IPS

The presentation of the course is based on overhead transparencies. Each participant receives a copy of the IPS User Training Manual which includes copies of the transparencies used, along with relevant descriptive text and a copy of a Handbook describing IPS services.

Generally the course is aimed at the HF communicator, but the presentation can be tailored to suit the audience by emphasising topics of special interest.

The UTC course is presented in Sydney during September of each year. For other regions, the course is presented regularly, usually on a two year cycle, at locations throughout Australia. The following table provides details of locations and dates for proposed courses for financial years [illegible]

Perth	July 1987
Adelaide	October 1987
Darwin/Alice Springs	April 1988

Venues for the courses have not yet been organised. Usually during the registration period prior to a particular course, participating organisations are invited to offer a suitable venue. The cost per person attending a scheduled course is $55 for the day.

The training course will normally occupy the period 0900 to 1500.

IPS can provide user training courses outside of the above schedule. In this case, a flat fee of $500 per day is charged and there is no limit to the number of people attending the course. Each participant will be presented with a training manual (additional charge $10) which covers the course content. The inviting organisation is asked to provide travel, accommodation and meals.

For further information contact D G Cole, Assistant Secretary, IPS Radio and Space Services, 162-166 Goulburn Street, Darlinghurst, NSW 2010. Phone (02) 269 8555.

HEAD OFFICE MOVES

Vicom Australia Pty Ltd has recently moved its Head Office to cope with an aggressive expansion program commenced at the start of 1987.

Vicom has moved to new premises at South Melbourne, which offer expanded areas for its research and development, consulting and manufacturing activities. The new building covers 14 000 square feet and also houses Vicom's National Service and Support Centre.

This is Vicom's third relocation since commencing business in 1974.

The company has recently diversified into the computer business with the distribution of *GRiD* laptop personal computers. The GRiD is considered the *Rolls Royce* of personal computers.

Vicom's new address is 4 Meaden Street, South Melbourne, telephone (03) 690 9399.

ESD INTERFERENCE SIMULATOR

The new high-performance Electro Static Discharge (ESD) simulator NSG 432 has been designed by Schaffner Elektronik AG to simulate electrostatic discharges in a range from 2 to 25 kV. The high 25 kV test voltage complies with recent test specifications and makes it ideal for testing devices requiring high security against ESD interference and sabotage.

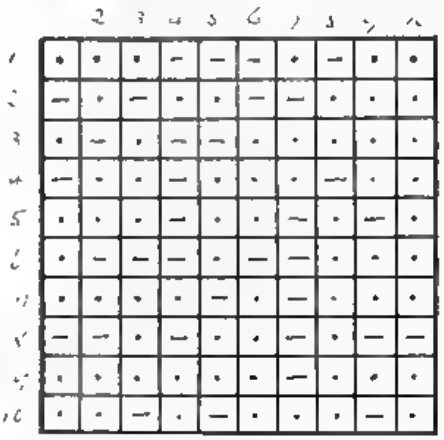
The NSG 432 design concept provides the ability to add the following options for special test operations.

- Power supply with precounter to preselect a required number of discharges
- Negative HV cascade for negative discharge from two to 25 kV
- E field adapter simulating body capacitance
- H field adapter generating induced electromagnetic interference
- Adjustable spark gap for calibrating the discharge distance onto the test object

The NSG 432 being a universal ESD test instrument is conceived to meet all relevant national and international standards, the simulator is designed such that it can be expanded to meet future legislation.

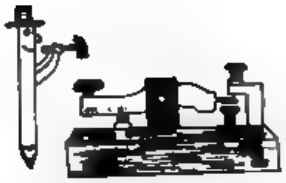
For further details please contact Westinghouse Systems, 80-86 Douglas Parade, Williamstown, Vic. 3016. Telephone (03) 397 1033.

MORSEWORD 3 SOLUTION



Across: 1 sore 2 trade 3 apse 4 nail 5 Vic 6 jab 7 sari 8 gnaw 9 hits 10 inner

Down: 1 arid 2 fare 3 rust 4 noted 5 kilt 6 gibe 7 log 8 tides 9 evert 10 hied



Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

Funnily enough, I am writing this on March 10, only a few days before the John Moyle Field Day. Last weekend I visited my chosen site for a test and found thick ice on the telephone pole that I was to climb to string up the dipoles. If it is not so cold next Saturday I may get the other one tuned up in time. Thanks Peter VK2PA for the test transmission.

Contesting is a bit like sitting for your Morse exams all over again, isn't it? A lot of hard work and preparation and then waiting for the results. Thank goodness it is a lot of fun, especially if you try new things in the field day. Three telephone calls is all it took to obtain permission to use the Mount Hotham fire lookout tower, so I'll let you know how it goes.

This month I have more letters from amateurs asking for help or advice with on-air practice. I mentioned this on the Friday net (3.510 MHz 1030 UTC) and both Les VK3BPW and John VK3PIZ have very kindly offered their services. So if you are after a Morse QSO, as slow as you like, you don't have to join a net, just drop Les or John a line, OTHR. Why not drop in on the net too?

Another regular net member, David VK3DVW, has sent in the following article written by Maurie VK3AVO. It should straighten out some of the errors we have been making in our terminology. I know I often use the term CW when I should use [redacted].

"The terms CW and Morse code are not, never have been, and never will be equivalent or synonymous. CW is simply one of several methods by which this code is sent over the airways. The definitions to be used in this article are based on English specifications as spelt out in reference[1]. I have been told, but cannot verify by reference, that some American texts differ in these specifications but my original statement still stands. CW and Morse code are not one and the same thing.

"Let us examine each method of transmission in turn and look at its characteristics.

(1) CW or continuous wave

This is by far the most common mode of telegraphy by which the code is sent. One central frequency now, but not always, called the carrier is used. It is broken into the familiar dits and dahs by a process that turns the transmission on and off according to the message being sent. This mode of transmission has the disadvantage of not being readable on a receiver that lacks a BFO, as the speaker only emits a series of hisses.

Back to the statement regarding the word "carrier." Originally this word was applied only to telephony as it was said to 'carry' the information after modulation of its amplitude or frequency.

(2) ICW or Interrupted Carrier Wave

This method transmitted the carrier in a series of very short bursts each time the key is depressed. If the carrier is interrupted at an audio frequency rate, say 1000 times per second, this signal will produce an audio tone of 1000 Hz after it has passed through the demodulator stage of a 'conventional' AM receiver and hence a BFO is not necessary for reception.

The most common method used to produce this interrupted carrier was to use an interrupter or tone wheel driven by an electric motor. The rate of interruption and hence the frequency of the audio tone was determined by the number of segments on the wheel and the rate which it was rotated.

(3) MCW or Modulated Continuous Wave

With this method the carrier was transmitted for the entire over. Code transmission is achieved by keying, hence turning on and off, an audio oscillator which amplitude modulates the carrier during key down periods thus producing the usual upper and lower sidebands. This mode too can be received without the use of a BFO but occupies more of the spectrum because of the sidebands.

" . . I was prompted to write this article after reading the Editorial of an amateur radio magazine (not AR). The subject under discussion was who should conduct the CW examinations. Perhaps the day will come when we will be examined by listening to Morse code sent over the airways by the CW mode. I am joking of course but my point is this — confusion regarding CW and Morse code has been going on for far too long and it is a shame to see it being perpetuated in professional publications.

References 1/1939 Radio Engineering, Odhams Press Ltd, London."

Thanks David, the above article will make it sink in, I'm sure.

I guess it is a lot easier to say we like CW than Morse code, or perhaps more correctly International code. The original Morse code was really nothing like what we now use.

Now a quicky from Jack VK5AF which I will squeeze in because if I don't it will be sure to get lost in the files.

Jack says, "I cut my teeth on the sounder and they say that if you can read the sounder, you can read anything. I well remember my first fair-dinkum exposure to visual telegraphy when I was a Radio Officer in a merchant ship during the war. Merchant vessels do not usually carry signalers, this duty devolving to the deck officers. Because signals is only a small part of their curriculum and they do not get a great deal of practice in peacetime, some were not over proficient at high speeds, whereas Navy signallers were good, knew it, and delighted in taking a rise out of us Merchant Service yobbos. It was therefore common practice for radio operators to double as signallers.

"It was our first day in convoy, and, just on daybreak I received a call on the bridge blower telling me 'get yourself up here Sparks and see what this joker is on about'.

"Climbing out of my comfortable chair in the nice warm radio room and throwing on some wet weather gear, I made my way to the bridge. Through the rain squalls I could just make out a destroyer over on the horizon, blinking at us at about 15 words per minute. (Fast for V/S). The message contained our zig-zag courses for the next 24 hours (zig-zagging, random course changes, was a ruse to make it a bit more difficult for enemy submarines to aim their torpedoes) and there was no room for error, as, with some 30 ships steaming in close formation, if everyone did not do the right thing at the right time, the resulting kerfuffle can be imagined. I didn't have to change my underwear when I went below but it was close.

Before I close down for this month, there is some advice that I really need. Since starting what I thought would be a mammoth task in writing, I have found that what is needed is something more. It seems that there are an awful lot of amateurs out there who need a lot more information than Pounding Brass can supply. Not only do I fail to reach half or less of the amateur population, of VK land, but there is a lot of information pouring in from sources that just will not fit. Marshall was hinting about a book devoted entirely to Morse, and I agree that is what is needed. So, to start off, I will be collecting all the information that I can on the subject, including items on operating practices, codes, abbreviations, equipment etc, with the hope of finding a publisher who, together with appropriate advertisers, can finance a publication in the cheapest format. Please don't expect miracles, but do send me your ideas.

—73, Gil

Sydney Amateur Digital Communications Group AX25- X3 Protocol for use in Amateur Packet Radio

Steven Blanche VK2KFJ
Secretary, SADCG
PO Box 231, French's Forest, NSW. 2086

Part 3: TNC PARAMETER VALUE SUMMARY

* = default value
\# = not supported
% = additional to X.3 standard
Values in square brackets are the defaults for Transparent Mode

NO	DESCRIPTION	VALUE	FUNCTION
1	Command Escape Character	0	not possible
	[0]	*27	ESC character
		1-26, 28-255	optional values
2	Echo	0	no echo
	[0]	*1	echo
3	Data Forwarding	0	full packet only
	[0]	1	alphanumerics
		2	carriage return
		4	ESC, BEL, ENQ, ACK
		6	carriage return, ESC, BEL, ENQ, ACK
		8	DEL, CAN, DC2
		16	ETX, EOT
		18	carriage return, EOT, ETX
		32	HT, LF, VT, FF
		126	all control characters
		%128	line feed
		*%130	line feed, carriage return
4	Idle Timer	0	no timer
	[4]	*32	approximately 7.5
		1-31, 33-255	other delay values
5	Flow Control to TNC	0	no flow control
	[4]	1	X-ON/X-OFF (data transfer)
		2	X-ON/X-OFF (data transfer and command)
		*4	CTS/RTS flow control
6	Control of TNC Service signals	0	no service signals
		1	transmit service signals
	[0]	*5	transmit service and prompt signals
7	Operation on Break	0	no action
	[8]	*8	escape from data tranafer state
8	Discard Output	*0	normal data delivery
	[0]	1	discard output to terminal
9	Carriage Return Padding	*0	no padding
	[0]	1-255	number of nulls inserted after CR
10	Line Folding	*0	no line folding
	[0]	1-255	number of characters per line
11	Binary Speed (set up by AUTOBAUD)	0	110 bit/s
		1	134.5 bit/s
		2	300 bit/s
		3	1200 bit/s
		4	600 bit/s
		5	75 bit/s
		6	150 bit/s
		7	1800 bit/s
		8	200 bit/s
		9	100 bit/s
		10	50 bit/s
		#11	75/1200 bit/s
		12	2400 bit/s
		13	4800 bit/s
		14	9600 bit/s
		15	19200 bit/s
		#16	48000 bit/s
		#17	56000 bit/s
		#18	64000 bit/s

NOTE: It is not possible to change parameter 11 using SEt command.

	Flow Control to Terminal	0	no flow control
	[2]	*0	
		1	X-ON/X-OFF flow control
		%2	CTS/RTS flow control
13	Line Feed Insertion	0	
	[0]	1	after carriage return to terminal
		2	after carriage return from terminal
		4	after echoed carriage return
		*5	values 1 + 4
		6	values 2 + 4
		7	values 1 + 2 + 4
14	Line Feed Padding	*0	none
	[0]	1-255	number of nulls after line feed
15	Editing	0	off
	[0]	*1	on
16	Character Delete	*8	BS (backspace) character (^ H)
	[8]	0-7, 9-127	other characters
17	Line Delete	*21	NAK character (^ U)
	[21]	0-20, 22-127	other characters
18	Line Display	*18	DC2 character (^ R)
	[18]	0-17, 19-127	other characters
19	Editing Service Signals	0	no editing service signals
	[0]	1	editing for printing terminals
		*2	editing for display terminals
			editing using characters from range 32-126
20	Echo Mask	*0	
	[0]	1	no echo of carriage return
		2	no echo of LF
		4	no echo of VT, HT, FF
		8	no echo of BEL, BS
		16	no echo of ESC, ENQ
		32	no echo of ACK, NAK, STX, SOH, EOT, ETB, ETX
		64	no echo of editing characters
			no echo of all control characters or DEL
#21	Parity Treatment	#0	no parity detection or generation
	[3]	#1	parity checking
		#2	parity generation
		*#3	value 1 + 2
22	Page Wait	*0	no page wait
	[0]	1-255	number of line feed characters before waiting
%23	Buffer Cushion	*80	number of characters in buffer
	[80]	2-79, 81-254	
%24	Linked Timeouts	*16	maximum consecutive timeouts linked
	[16]	1-15, 17-255	other values
%25	Unlinked Timeouts	*5	maximum consecutive timeouts when not linked
	[5]		not linked
		1-4, 6-255	other values
%26	Line Timeout	*10	approximately 10 seconds
	[10]	1-9, 11-255	other values
%27	Duplex Line Control	*0	no duplex line control
	[0]	1	always assume that channel is clear
%28	Clear to Send Delay	*32	approximately one
	[32]	1-31, 33-255	other values
%29	Link Control	*0	normal
	[0]	1	links to other nodes not permitted
%30	Unused Link Control Parameter		
	[0]		
%31	Information Frame Call Sign display while unlinked	*0	0 = do not display call signs
		1	1 = display call signs while unlinked
%32	Received Packet Forwarding	0	only pass packets when linked
	[1]	*1	pass unlinked packets
%33	Maximum Packet Length	*200	maximum output packet data bytes
	[200]	3-199, 201-250	other values
%34	Unused Network Control Parameter		
	[0]		
%35	Digipeat Control	*1	0 = digipeating disabled
	[1]		1 = digipeating
%36	Unused Network Control Parameter		
	[0]		
%37	Unused Network Control Parameter		
%38	Unused Network Control Parameter		
	[0]		
%39	RLSD (CD) Line Control	*0	always on
	[0]	1	indicates if link is established
%40	Data Mask	*127	mask off high order bit
	[255]	255	pass all eight bits in each byte

In the manual, there is references to the Master Control Subsystem This is a part of the software package supplied by the SADCG for the VADCG TNC, and will be covered in more detail in Part 4.

Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU
EMC REPORTER
25 Berrille Road, Beverly Hills, NSW 2209

TV & FM-BC PRE-AMPLIFIERS AND THEIR PROBLEMS

Preamplifiers are installed because the received signal is not sufficiently strong to permit, for example, "snow-free" television reception or noise-free stereo FM signals. The RF gain of the television set or FM radio front end may be too low or the RF amplifier may generate too much noise. This means, also, that the receiver is working with maximum gain, and under these conditions, the dynamic range and intercept point may be very low too. Therefore, legal transmitter operation in the vicinity of these installations may affect the television and FM reception, unless these receivers have sufficient selectivity to make them compatible with other services, which do not operate on television or FM radio channels. The users of these receivers will usually blame the innocent legal transmitter operators, claiming that they cause *interference*. They may not understand that legal transmissions do not cause *interference*; they may *affect* substandard (perhaps illegal) receivers in an undesired way. It is up to the users, and manufacturers to make these receivers or preamplifiers compatible with legal transmissions, which do not use television or FM channel frequencies. Did the dealer who sold the preamplifier, and perhaps installed it at the masthead or under the roof, inform the customer that he may have to expect unwanted RFI? Do we have standards, which define the selectivity and dynamic range requirements these preamplifiers have?

This situation became so bad in West Germany, overloading the local radio inspectors with complaints, that the FTZ (equivalent to VK's DOC), had to introduce the necessary regulations and exercise strict controls, because most people lived in home units using preamplifiers. The electronics magazine *Funkschau* (West Germany) issued several special editions to educate all concerned on the EMC requirements (*Funkschau*, No 12, 1977). The installation of the preamplifiers has also to be checked by the RI to avoid situations as reported by K9POX (*QST*, November 1986) (see later). The regulations go back to July 11, 1974, the installation and use of preamplifiers has to be reported to and permitted by DOC (local RI), and an inspection and test is to be carried out by the RI. The technical standards cover selectivity and dynamic range and other safeguards. Preamplifiers having a flat response from 40-400 MHz (sold in some countries) are illegal in West Germany. Using these amplifiers is asking for trouble, and so often the innocent party is being blamed. These amplifiers also amplify the unwanted signals from all the other services which operate within this frequency band legally. The six and two metre amateur bands are only one example and police, taxis, mobile radiophones of many organisations (like the Europa-Signal, in Europe) use transmitters legally in this range. Where UHF-television is used, the preamplifiers will also cover that range, which is also used by radio amateurs (70 cm band) and other legal services.

TRANSLATED FROM THE *FUNKSCHAU* EMC REPORT

If RFI is reported by a preamplifier user, and the installation does not conform with the FTZ technical standards, the permit to use this installation and preamplifier will be revoked, and the equipment must not be used any longer. The installation has to be brought up to the necessary standard by adding filter circuits between the antenna and the preamplifier, which will sufficiently reduce signals out of television and FM radio bands. Medium wave frequency circuits covering 0.15 .. 1.6 MHz are usually included also. The modified installation has to be reported again to the RI, to be inspected and tested, before the permit is reissued. These regulations, and their strict enforcement, have an added benefit, because they teach the television and radio listener/viewer that his equipment can be at fault, and that RFI is not automatically the fault of the nearby radio amateur. Are our neighbours likely to believe us or the Radio Inspector, or the television serviceman and salesman? Additional filter circuits will have to be installed between the various antennas (long wave, medium wave, short wave, television, FM radio antennas) and the preamplifier, if, in spite of correctly installed amplifiers, RFI is experienced from other legally operated services working on different frequency channels. The television manufacturers and special antenna manufacturers supply these filter units.

Figure 1 shows the circuit of the Wik 501 filter. Table 1 shows the frequency bands the filter passes with about 2 dB (or less) insertion loss and also the attenuation of about 18 dB for the unwanted frequency bands for each of the five antenna connections. Only a very short coaxial cable should be used between the filter and the preamplifier, both of which must be fully shielded and in a weatherproof housing if installed at the masthead. Figure 2 shows another filter (works photograph: Hirschmann) model 60 S 9, which has three independent filter sections for long wave, medium wave and short wave for the television bands IV/V and III. Table 2 again shows the filter characteristics, which are especially selected to attenuate unwanted (but legal) signals from amateur radio operators, as we can see from the frequency bands mentioned. The insertion losses are lower and the attenuation is higher (over 30 dB in most cases). L6, L7, L9, C10 form a trap for the 70 cm amateur band. Preamplifiers can also add problems of their own, by over-amplifying long wave (in Europe) medium wave and shortwave signals, thereby causing cross-modulation if the equipment works in the vicinity of strong radio transmitters. These amplifiers could also radiate harmonics of the line frequency oscillator at 15.625 kHz. Switch- mode power supplies are another source of unwanted signals. Therefore, one does not use preamplifiers for these low, medium, or high frequency bands. Special filters are available to suppress excessively strong local radio transmitters (100 kW and more ERP). The Auth Co supplies special filters to suppress strong CB transmitter signals (Figure 4). Figure 5 shows the filter to suppress the Post Office radio telephone signal *Europa*. We see that filter design and availability is a precondition for using preamplifiers without running into difficulties, such that the nearest radio amateur or CB operator was usually blamed. Filters like those shown here, or similar design have become a $multi-million business, keeping several special firms busy. Without the filters it would, in many cases, not be possible to obtain compatibility of transmitter services and receiver users. More will be said on filters in a later EMC Report.

MORE MAST-MOUNT AMPLIFIER QRM

"I'd like to bring to your attention a situation that appears to be bringing bad publicity to the amateur radio community through no fault of our own. I was recently appointed an OO (Official Observer) and have been involved with broadcasting in the Chicago area for 26 years. Within the last couple of years, our television station (Channel 5) has been *deluged* with complaints of severe interference to our off-the-air signal in many diverse locations. The station management asked Engineering to look into the problem (in the interest of viewer relations), and I was given the assignment (being a radio amateur and involved in "fox hunting" in the past). We have had very good luck in finding the TVI sources; and most (95 percent) have turned out to be oscillating television antenna amplifiers that have been

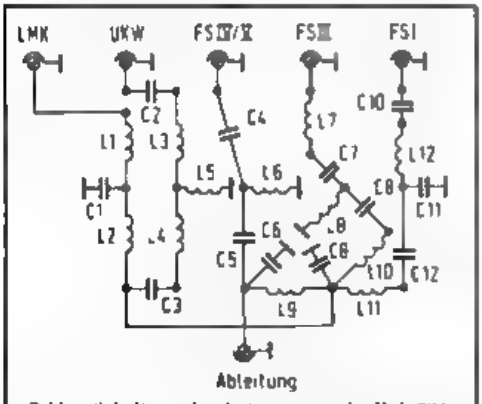


Bild 1 Schaltung der Antennenweiche Wik 501

Figure 1: Circuit of the Antenna Filter, Wik 501.

Tabelle 1 Betriebsdämpfung bei den einzelnen Frequenzbereichen der Antennenweiche Wik 1 von Hirschmann

Eingang 1 Bereich I (47..68 MHz)
Eingang 2 LMK-Bereich (0.15..26.1 MHz)
Eingang 3 UKW-Bereich (87.5..104 MHz)
Eingang 4 Bereich III (162..230 MHz)
Eingang 5 Bereich IV/V (470..860 MHz)

Dämpfung	47..68 MHz	0.15...26.1	87.5..104	162...230	470..860MHz
Eing. 1/Abltg.	≦ 2 dB	≧ 18 dB	≧ 18 dB	≧ 18 dB	≧ 18 dB
Eing. 2/Abltg.	≧ 18 dB	≦ 2 dB	≧ 18 dB	≧ 18 dB	≧ 18 dB
Eing. 3/Abltg.	≧ 18 dB	≧ 18 dB	≦ 2 dB	≧ 18 dB	≧ 18 dB
Eing. 4/Abltg.	≧ 18 dB	≧ 18 dB	≧ 18 dB	≦ 2 dB	≧ 18 dB
Eing. 5/Abltg.	≧ 18 dB	≧ 18 dB	≧ 18 dB	≧ 18 dB	≦ 2 dB

Table 1: Radio and Television Passbands and Attenuation Frequencies of the Hirschmann Filter Circuit.

Dampfung = attenuation
Eingang = antenna connection terminal
Bereich = frequency band

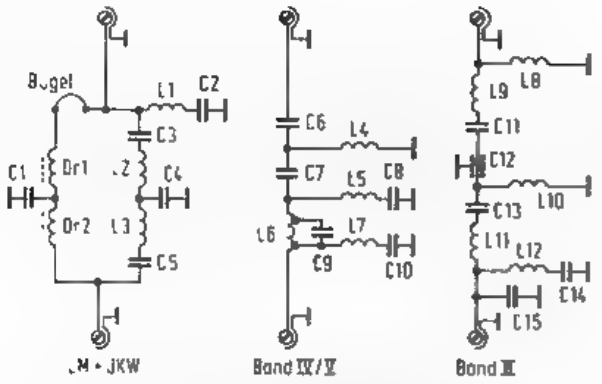
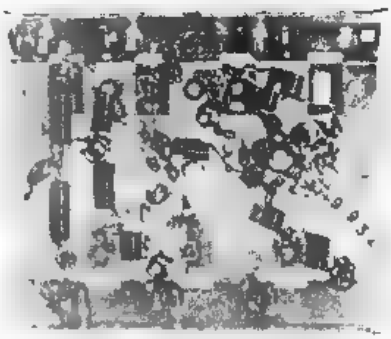


Bild 3. Schaltung der einzelnen Filter der Bandpaßkombination Sperr 60 S 9

Figure 3: Circuit of the Individual Filters of the Bandpass Combination 60 S 9.



Photograph Hirschmann (West Germany)

Figure 2: Inside View of the Filter Combination 60 S 9.

Tabelle 2. Betriebsdämpfung bei den einzelnen Frequenzbereichen der Bandpaßkombination Sperr 60 S9 von Hirschmann

Betriebsfrequenzbereich
Filter 1 LM: 0,15...1,6 MHz
UKW 87,5...104 MHz
Filter 2 B III: 174...230 MHz
Filter 3 B IV/V: 470...790 MHz

Frequenz MHz	0,15...1,6	3,5	7	14	21	28	87,5 104	144...146	174...190
Filter 1 LM + UKW	≦ 1	≧ 15	≧ 26	≧ 32	≧ 30	≧ 30	1,5 ±0,5	≧ 40	≧ 30 dB
Frequenz [MHz]	0,15...1,6	3,5...28		87,5...104		144...146	174...230	430...440	470...790
Filter 2 B III	≧ 40	≧ 40		≧ 30		≧ 30	1 ±0,5	≧ 40	≧ 40 dB
Frequenz [MHz]	0,16...1,6	3,5...104		144...146		174...230	430...440		470...790
Filter 3 B IV/V	≧ 40	≧ 40		≧ 35		≧ 20	≧ 20		1,5 ± 0,5 dB

Table 2: Attenuation and Passband Frequency Ranges of the Filter Combination 60 S9.

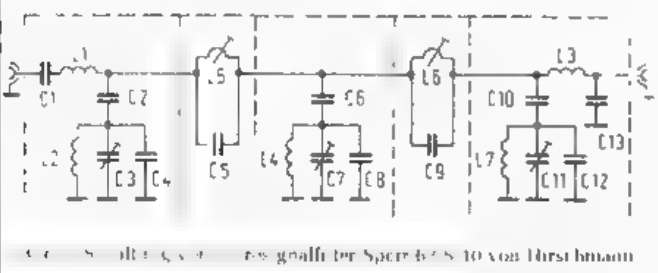


Bild 4 ▶
Dampfungskurve vom Sperrfilter BSF 27 für das 11-m Jedermannband von

Figure 5.

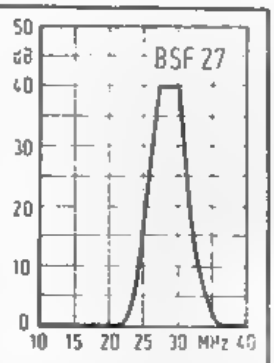


Figure 4.

incorrectly installed or operated by nontechnical viewers

"We've discovered than an oscillating antenna amplifier can radiate an interfering signal for three-quarters of a mile or more from the source and cause a *complete* blackout of picture and sound within the same block. In most cases, the affected viewer tends to point immediately to amateur antennas in the area when trying to help us locate the offending signal. We've tried to inform them that amateur interference does not generally behave like that, nor is it on 24 hours a day, but often people believe only what they wish to believe. The problem is quite serious and promises to get worse as more and more gadgets permeate the market only to be hooked up improperly by the general public. It's unfortunate that amateurs are being blamed in many cases for this situation, but that is our apparent image in the mind of the average person.

"*Radio Shack* markets a 25 dB gain, 300 ohm antenna amplifier that turns into quite a devastating transmitter when the input and output leads are taped together as one viewer decided to do. That one took out a whole town! I'm not trying to indict *Radio Shack* in particular; any brand of amplifier can become unstable when not properly installed or terminated."

—David F Miller K9POX, 7462 West Lawler, Niles, IL 60648, in *QST*, November 1986

The case of RFI reported by K9POX, was the result of wrong installation. Other cases have been reported too. One masthead preamplifier had been forgotten, but was still connected to the television antenna, although the supply power had been removed. The front end transistor acted as a diode (a non-linear device) which distorted clean signals from other legal services. The distorted signals contained a harmonic which was tuned to the input circuit of the preamplifier and reradiated RFI on a television channel via the television antenna. This source of RFI, for which, as usual, a radio amateur had been blamed, was eventually discovered with the help of very experienced radio inspectors, who did not give up even after many attempts to locate the problem source.

ar

FUNKSCHAU 1977, Heft 12

PET TRACER

ELECTRONICS CAN NOW tell you where, oh where your little dog or cat or Holstein has gone with a microchip injected under its skin with a syringe.

The tiny microchip carries information about the animal and its owner. It is encapsulated in glass — the whole package about the size of a grain of rice — and inserted by a veterinarian in the skin on the animal's back. All you need to read the information from the chip is a wave of the wand on a specially designed reader. The cost of tagging an animal is about US$40 to US$60. The reader is about US$1800.

The first place to use the reader is an animal shelter in Colorado Springs. They will be waving the wand on all the strays they pick up in hopes of identifying the animals and their owners. And that should have them singing, "I've Got You Under My Skin."

—Adapted from *Gemsback's Outlook*, February 1987

Over to You!

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

NEVER BEEN DISAPPOINTED

Let me take this opportunity to thank you for the excellence of the publication. I look forward to its receipt each month and have never, in the three years of my membership, been disappointed by its contents.

Thank you.

Best 73,

Mario Dolfen VK3NI,
Box 119,
Montrose, Vic. 3765.

CONCERNING CW

It is quite obvious many amateurs wish for the elimination of a test for Morse code.

The recent statement in a widely read publication — " if a candidate can read five or 10 words-per-minute they should not have to pass a sending examination. "

This is utter "balderdash" and shows the ignorance of those responsible for thinking along such lines.

Learning Morse code is a tedious and disheartening process. There are no patent methods which accelerate it in the smallest degree, and the student who worries about it in the least usually gets on the best. To read Morse at 20 WPM only means the operator has heard the letters so often that a particular Dit/Dah combination recalls the letter with no appreciable time- lag. A rough calculation shows the average student has to hear every letter about 40 000 times before he recognises it without conscious effort. Of course, much less for five to 10 WPM.

There is nothing clever in reading Morse and nothing difficult in learning to do so. It is merely a matter of having daily (repeat *daily*) practice at gradually increasing speeds and making reasonable efforts to read it — frantic efforts are worse than useless — Morse should always be taken calmly.

As regards the sending of Morse, every operator should take a pride in the rhythm and accuracy of his sending.

When a mistake occurs in a message, it is nearly always the fault of the sending operator (90 percent).

Sending perfectly formed and spaced Morse is not easy, although many operators think it is.

The art of sending Morse is not to be regarded lightly — hence this letter.

Use the facilities of the WIA Slow Morse Sessions and enjoy real amateur radio. Although a retired steam locomotive driver from the Victorian Government Railways, my experience of sending Morse extends over a period of 62 years.

I am not knocking SSB, however I find many operators do not know the correct Phonetic Alphabet speak too quickly, mumble, use incorrect procedure, show intolerance, do not use dummy loads, but worst of all — *do not listen out before transmitting.*

Give yourself a treat — QSY to the CW-bands such as the HMAS *Castlemaine* Net under the hand-pump of Margaret VK3QU.

Hundreds of operators can be found happily 'pounding brass" — just to mention two; Peter VK2PA and Rex VK2YA — sending and receiving 50 WPM-plus in their heads, far more accurately and quickly than SSB. It is interesting to note that the Iron Curtain Block place great importance on Morse code — Why?

No further correspondence entered into!

73/88

H D Alderson VK2EP,
(ex-RAAF, Pacific Zone WWII, TPI 20 years)
[redacted],
Emerald Beach, NSW. 2456.

NATIONAL SPRINTS

The Adelaide Hills Amateur Radio Society advises that the second running of the National Sprint Contests is tentatively scheduled for July 11, 1987 (CW) and July 18, 1987 (Phone). Rules will be similar to the first Sprints and will be published in advance of event.

Results of the first Sprints as published in the February issue of *Amateur Radio*, contained some typographical errors.

Under the heading 1986 National Sprint Results, the score for VK5ZN should read 32 vice 37.

Under the heading 1986 National Phone Sprint Results, VK3JA should have been shown as having earned a certificate for equal first place in VK3.

The Society regrets any inconvenience or embarrassment these errors may have caused.

—For the Adelaide Hills Amateur Radio Society, M G Emen VK5FN (President)

ENJOYABLE

Just a note regarding the article by Bert Thrupp VK5BVN, regarding Antarctic Communications.

I listened to the earliest of these broadcasts and I enjoyed Bert's article immensely and I thank him for it.

John Atkinson VK4RZ,
9 Maxwellbrown Drive,
Southport, Qld. 4215.

MORSEWORD

Having derived pleasure from Morseword 1 in April AR, I write to thank Audrey Ryan for the novel idea.

What surprised me was that, when most characters had been found, still some words were elusive. Of interest also was, that with identical characters my words were different; eg SEAL instead of HARE and LIST instead of ASSET. KEPI eluded me entirely and needed the solution, which prompts me to suggest that the solution be held in future for the following edition.

Congratulations to Audrey and I hope future puzzles will become a part of AR.

Yours sincerely,

Don Oakley VK3BKU,
12 Norris Road,
Rowville, Vic. 3178.

CONGRATULATIONS

My congratulations to Tony Tregale for his timely letter in April 87 AR.

Contrast this with the opinions of Rick Rickard in the same issue advocating even lower standards for the RAE — Heaven Help Us! It is a fact to be regretted that there are so many in our society hell-bent on lowering standards and expecting everything to be handed to them on a plate.

Furthermore, Mr Rickard would do well to appreciate that the equipment he now enjoys was made [redacted] by many of those, now 55 and over, whom he effects to despise.

Yours fraternally,

Bill Dukes VK2WD,
44 Avlan Crescent,
Lane Cove, NSW. 2066.

NOT NEUROTIC

Unlike Mr Tregale VK3QQ, I do not engage in virulent personal attacks on fellow amateurs.

My valid criticisms of the ATN have been directed against its operational procedure in amateur radio emergency methods and procedures, not its members.

If, according to him, 'neurotic' means advocating logical, common sense and standardised operational networks then he must have misread his directory or is unable to see the difference between constructive and destructive criticism.

His snide remarks concerning the 'destruction' of the ATN are completely refuted in my letter AR, August 1984, page 52, which states: and I quote: "...the logical solution would be for the ATN to use the SES/WICEN system within this country and the ARRL system overseas.

They would then be compatible and the SES and WICEN would welcome their co- operation."

So much for Mr Tregale's spurious allegations! The other remarks are puerile. Since he mentions 'democracy and freedom of the press being everyones right' — (except of course for defamation) — then I would remind him of the basic tenet of the democratic freedom of speech, expression and constructive criticism which is contained in this quotation.

"I may disapprove of what you say, but I will defend to the death your right to say it."

(Voltaire)

Yours sincerely,

Ted Gabriel VK4YG,
PO Box 245,
Ravenshoe, Qld. 4872.

SAVE AMATEUR RADIO WITH NUMBERS

Tony Tregale has done it again; expressed an opinion with which I agree (AR April)

The supporters of 'save amateur radio with numbers' overlook some important points.

The quality of the participants in the service is more important than the quantity and adequate technical knowledge is an essential component quality.

Without a basic understanding of the technology, progress with self- education, technical investigations and communication in the language of the art of radio communication is impossible.

International communication in the language of the art is the main means for exchanging knowledge about radio communication and a major justification for the retention of the service. Our image in the international forum will not be very good if all we can provide are mere smatterers.

It is probably easier and in the long term, more beneficial for the WIA to encourage quality improvement in its members and to lobby for higher qualifying standards rather that the alternative of more numbers and lower qualifying standards.

Referring to the April editorial. Devolution is not a new buzz word, I have heard it many times during my professional career.

Organisations devolve tasks which they don't want because they are incapable or just plain lazy.

Executive administrators promoted beyond their level of competence devolve tasks and responsibilities to incompetents of lower rank.

Engineers devolve onerous duties to technicians and technicians do the same to mechanics and so on.

My 'heirloom' dictionary circa 1930 defines devolution and that definition is confirmed by my 1984 edition of the *Oxford Concise* but the Oxford suggests degradation as an alternative. My experience indicates that degradation of services and the execution of tasks is a likely outcome of devolution.

I suggest that WIA members oppose devolution of public service duties and responsibilities to the WIA; it is not qualified and its resources are not equal to the task. Most importantly, as Tony suggests, the WIA privately aligned interests must be a disqualification.

Has the Executive considered the poss bil ty of a challenge to the legality of any devolution? I might for example, be sufficiently concerned about the matter to mount a legal challenge with or without the support from fellow amateurs.

In the meantime it might be worthwhile informing my representative MHR about the possibility and my good reasons for opposing it.

Yours faithfully,

Lindsay Lawless VK3ANJ,
Box 112,
Lakes Entrance, Vic. 3909.

(While quality is vital, increased numbers provide economies of scale, since many costs are fixed irrespective of the numbers receiving the service. "Devolvement", not "devolution" was the word described as "new". The WIA is as qualified as its best available members. Its interests are "privately aligned" only to seeking the improved well-being of ALL its members. How is this a disqual fication? —Ed)

Five-Eighth Wave

Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA. 5039

THE 10TH ANNIVERSARY THAT NEARLY WASN'T!

A chance remark during a conversation with John Ingham VK5KG, our Federal Video Tape Co-ordinator, made me realise that it was 10 years since the opening of the Burley Griffin Building, at which point, John raced off to check and came back to inform me that I had less than a week to organise something as the official opening date was April 3! As there was no way that it was going to be possible to organise something at such short notice, it was decided, in consultation with other members of Council, to celebrate this special event on the night of the AGM, April 28. It was also decided to invite those who were on Council in April 1977 and the others who were instrumental in acquiring and renovating the building. The list read like a *Who's Who* of the VK5 Division and it was with some trepidation that I realised that, as President, I should be chairing my first AGM, reading my first Annual Report, etc, in front of a possible seven past-presidents and five Honorary Life Members! ! ! The list reads as follows.

President — Garry Herden VK5ZK
Vice-President and Treasurer — Colin Hurst VK5HI
Vice-President and WICEN Representative — Gerry Preston VK5PI
Secretary, Publicity Officer and Country Representative — Gordon Bowen VK5CXU (Silent Key)
Minute Secretary and Federal Councillor — Ian Hunt VK5QX
Program Organiser — John Mitchell VK5ZJB (now VK5JM)
Associates Representative — Lee Wood (later VK5NVU, now VK5ALW)
Building Supervisor — Mike Hart VK5ZMH
ESC Chairman — Bob Murphy VK5MM
and Clive Pearson VK5PE

also involved were . .

Lee Diener VK5NJ and Geoff Taylor VK5TY (both were Divisional Presidents during the period in which the building was obtained and had a great deal to do with refurbishing of it).
Rob Wilson VK5WA, who was the driving force in helping to obtain the building.
Ross Dow VK5KF, Secretary at the time the lease was signed
Lindsay Collins VK5GZ, Keith DeKock, Curl Blythe VK5CL, Jack Dew VK5JX, Leith Cotton VK5LG. . .and many many more, who helped in the three years that it took to acquire the place and then turn it into the place that you see today.

In fact, the more stories that I hear about it, the more impressed I become.

I hope that April 28 (complete with a shortened version of the video of the opening and the special supper) will be a happy and memorable night for those who made our Headquarters building possible, and also for the rest of us.

PRESIDENT'S REPORT

Elsewhere in this column you will find the President's Report which will be given at the AGM on April 28. I decided that, by printing it here, there will be more space in the Journal for the 'important things' like ESC and Publications Lists!

DIARY DATES

SERG Convention — June 6 and 7
General Meeting — June 23. (Topic unknown at time of going to press) 7.45 pm.
Buy and Sell — June 30. Starts 7.30 pm — no ESC, QSL Bureau, Publications, etc.

PRESIDENT'S REPORT TO THE ANNUAL GENERAL MEETING OF THE VK5 DIVISION — April 28, 1987

This year has been a busy and memorable one in many areas, not least for those who were involved with the many and varied aspects of our Jubilee celebrations for our 150th Birthday. Our special event call sign was heard all around the State and even mobile in Texas, and from such varied locations as the Cape Willoughby Lighthouse, the Trade Train, the Paddle Steamer *Industry*, the Grain Clipper *Failee* and the Horse- drawn Train at Victor Harbour. We also helped to promote the Centenary of the City of Marion, and the opening of the Observatory at Stockport, which coincided with the best viewing period of Halley's Comet. So many people have been involved with these activities that it would be impossible to attempt to name them all. But three names have stood out from the crowd and I would like to thank Graham VK5AQZ, who was our Jubilee 150 Co-ordinator, Rowland VK5OU, our Jubilee Awards Manager, and John VK5SJ, who was responsible for organising the Jubilee Nets and also the Centenary Celebrations at Marion. To these and all the others we say thanks.

WICEN had a quiet year as far as emergencies were concerned, but was still very active providing communications for the Chinese Dragon boat races, the Walk Against Want, the Forest Rally and their most taxing activity — providing communications for the State Bank Discovery Trail.

Nearer to home, we sponsored the two-part National Sprint Contest organised by the Adelaide Hills Amateur Radio Society and had the interior and some of the exterior of the Burley Griffin Building painted. Our Journal format was changed to contain the escalating costs and was presented as an insert in AR. This has caused a few headaches in the "what to leave in or what to take out" line and I would like to thank Trevor Lowe VK5ZTJ and his wife Brenda for the excellent job they have done as joint editors.

It is always a sad occasion to announce that someone has become a Silent Key, but perhaps the one that came as the greatest shock this year was the death of Peter Barlow VK5NPC, our Broadcast Producer, only a few hours after he had recorded segments for the next broadcast. Chris VK5PN, stepped in at very short notice and continued for several weeks until his place was ably taken by Arthur VK5AAR, who continued until future commitments forced him to retire in January. Our current Broadcast Producer is Kevin VK5IV, who, like his predecessors, is keeping up the high standard we have come to expect.

Other changes this year have seen Chris VK5PN replace Sam VK5TZ as Broadcast Roster Co-ordinator, Hans VK5KHZ, take on the job of Program Organiser, and Paul VK5BWZ, has joined the Morse Practice Panel. Our two new members on Council, Peter VK5PRM and Bob VK5BJA, have proved themselves popular and hardworking members of the team. Bob has taken on a new position, that of Co-ordinator of SATAC, the South Australian Technical Advisory Committee, which in turn reports back to FTAC, its Federal counterpart.

During the year three new clubs have affiliated with the VK5 Division, the Barossa ARC, the Mid-North ARC and the Port Augusta ARC, which is very encouraging. Our major events for members were the Picnic at Bridgewater Oval, the Christmas Social — which included items by the Glenlea Singers and the presentation by John Hampel VK5SJ, entitled "Looking Back on Radio in South Australia — an audio history" an our recent Clubs' Convention.

During the year we had some excellent speakers and interesting displays on meeting nights, these included Barry Bryant VK5KAU on the "Central North ATV Repeater" in May; Ray Bennett VK5RM, discussing the duties of a Historian, in June, Steve Mahoney VK5AIM, on Antenna Rotators, in July; Steve Stephenson VK5ZB, on Power Supplies, in August; September was our usual Display of Members' Equipment night and October was a display of members' Historically interesting pieces of equipment. November say Hans Van Der Zalm VK5KHZ, speaking on Communications in Aviation, Ray Bennett was again our speaker in February, on "New Developments in Ionospheric and Radio Wave Propagation Research" (surely the longest title of the year!) and last month Den Smith VK5LS, gave an interesting insight into his tour of duty in the Antarctic.

I would like to thank all these people who entertained or informed us, also those who conduct and support our Buy and Sell nights, those who make our Broadcasts possible or keep our Morse Practice Sessions on air. In fact, to anyone who has done anything to improve or keep the Division in its present healthy form, we say thanks.

On this our 10th Anniversary of the opening of our Headquarters Building, we can look back in pride, but also look forward in anticipation to the next 10 years.

(I move the adoption of this report. . .)
Signed: Jennifer M Warrington VK5ANW
Divisional President

J150 AWARDS

1317	DK1QV	1318	9M2/5434 (1st 9M SWL)
1319	YC7JUL	1320	K9RHY
1321	YC0JXH	1322	G4XTA
1323	4S7NWR	1324	C21FS
1325	YB0BCA	1326	YB2IA
1327	DF5NW	1328	DJ2MN
1329	G4TKE	1330	ZC4IT
1331	PA3EKK	1332	YB2CR
1333	VU2DNL	1334	W8AH
1335	JA1ATB	1336	YC8VFB
1337	YB1ZN	1338	PA3DUP
1339	SP8AJK (1st SP)	1340	JF1CKL
1341	VU2DPD	1342	G0DNO
1343	JA3CAV	1344	C539U (1st C53)
1345	YB0AF	1346	JK3ACD
1347	JE7O	1348	JF8XGG
1349	VU2KYX	1350	YC5BEH
1351	YC5BEE	1352	YU2WM
1353	V85AK	1354	HA5XW
1355	RB5OX (1st Ukraine)	1356	VK5AAS
1357	5Z4BP (1st 5Z4)	1358	OE1TKW
1359	YO2BZV	1360	VK5BJF
1361	VK5PBL	1362	9V1WR (1st 9V1)
1363	KA1DJE	1364	KA5VTQ
1365	G4WOO	1366	N4HGZ
1367	N0CKT	1368	AA4NJ
1369	N0HFS	1370	Nike Aoki (JA7)
1371	G0BZG	1372	GM3EXS
1373	G3TMN	1374	DZ4BO
1375	A9OLI	1376	G0DKM/M
1377	YC0JWY	1378	YD0PXP (as an SWL)
1379	JS1LFB	1380	VK3KCL
1381	I2IAU	1382	ZL1BNT
1383	HL2ADV (1st Korea)		

VK3 WIA Notes

NEW MEMBERS

The following applications were received for the month of March 1987, and accepted by Council on March 26, 1987. A warm welcome is extended to them.

Phillip Katz VK3KPK, Colin Pink, Gerald Shnier, Roger Stafford, Jeremy Stokoe, and Peter Marmet HB9DCZ.

VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW 2150

DIVISIONAL COUNCIL

This year, at the time of the AGM, there were only five nominations for Council. This is a disappointing start to the new year as it places an even greater work load on those who stood. It is hoped that by the time these notes are published that the vacancies have been filled

Council is not the only place that the membership can assist. There are various committees and other functions which would benefit by membership involvement. If you can help in any area would you contact the Divisional Office with your offer.

As these notes were compiled, the major council positions had been filled as follows:

President	Roger Henley VK2ZIG/NWH
Vice-Presidents	Mike Burns VK2AUE
	Tim Mills VK2ZTM
Secretary	Peter Jeremy VK2PJ
Treasurer	Dave Horsfall VK2KFU

The other office bearers and committees will be listed next month.

1988 CELEBRATIONS

It is now just under six months until the new year and the various celebrations that 1988 will generate. Now is also the time for all clubs and groups to formalise any activities they are planning and let the Divisional Office know the details so that a central recording point can be maintained. The Division will also be involved in various activities during the year. This will require assistance from the membership to provide the manpower to conduct these activities, it is not something tat can be left to the Council to undertake.

Council would welcome ideas as to possible functions which would benefit by the presence of amateur radio.

VK2RWI REPEATER 7000

The continued anti-social behaviour occurring on this repeater has been a constant worry to some members and Council.

In late January, a warning was given that, if there was not an improvement in behaviour, the system would be turned off. The problems continued and the system was turned off. This caused one section of users to request it be restored and the matter brought before the AGM. The meeting debated the problem and concluded that the final solution rested with the Department to enforce the appropriate regulations and take action on offenders.

One of the suggestions as a possible way to control the problem while the Department took action was to shorten the time-out and extend the tail so that the system operated more as a calling repeater, allowing contacts to be established and the users to move elsewhere. Apparently few users attended the AGM as the actions did not meet with the general approval of the various users. After some days of what could only be described as mayhem, a forum of all interested users was called for April 8

Considerable discussion occurred at the forum. The conclusion reached was that the behaviour on this repeater by some users was neither in accordance with the regulations nor in the spirit of the Amateur Radio Service. It was further felt that, if a reasonable standard of decorum could not be maintained by the users themselves, the Department would have to increase surveillance and take whatever action was necessary.

It is hoped however, that the public airing of various points of view at the forum will assist. Repeater 7000 has excellent coverage and appears to attract the exhibitionists, besides being a problem of radio behaviour in a large population region. The repeater has now been returned to its normal time-out and tail length.

NEW MEMBERS

A warm welcome is extended to these new members who were in the April intake:

S L Carr Assoc	Campbelltown
J P Carroll VK2XFO	Campbelltown
R J Coleman VK2MBW	Bathurst
J M Lanser VK2XFP	Killara
A J Randell Assoc	Dundas
S P Reneman VK2MBS	Avalon
R Soulie VK2YQN	Fairfield
P Wheeler Assoc	Dee Why

Silent Keys

It is with deep regret we record the passing of —

MR A N (NOEL) LANSLEY	VK2MA
MR D J (JOE) WILSON	VK2DW

Obituaries

IVAN GRAHAM VK4QO

It is with deep regret that we record the passing of Ivan on March 13, 1987, aged 53 years.

Ivan was born at Biggenden on January 2, 1934, being seventh in a farming family of nine children

The family moved to the Callide Valley in 1937, settling at Goovigen and then moved to Thangool in 1942. Ivan spent some years as projectionist for the Regent Theatre, Thangool, prior to the introduction of television.

In 1964, he secured a position with Amagraze Meatworks at Biloela, and left the farm to make his home in Biloela about this time.

Ivan became interested in obtaining an amateur license in 1966, and joined the WIA that year. He passed the LAOCP examination in 1969 obtaining the call sign VK4ZIS upgrading to the full call in 1973. He was active on two and six metres and the HF bands, qualifying for the DXCC on 20 [redacted]

The Biloela Scouts and Guides looked to Ivan to organise the technical requirements for JOTA each year. He was also an active worker for the establishment of two metre repeater VK4RGA, in the Biloela, Monto and Gladstone area.

At the time of his death he was President of the Biloela and District Amateur Radio Club, a member of the WIA, WICEN Officer for the district and a member of the State Emergency Service

Despite his failing health, he remained interested in his hobby obtaining a two metre QSO with an enthusiast on the Asbestos Range in Tasmania earlier this year

Ivan was always ready to assist any newcomers to amateur radio to the extent of running classes. People were always welcome at Ivan's home at any time and he always appreciated any assistance he was given

Ivan was respected and loved. He will be sadly missed by his brothers and sisters, people of the Callide Valley and friends in amateur radio.

Mark Haseman VK4CMH (ex-VK4VOH)

QSP

DOC MODIFICATION WARNING

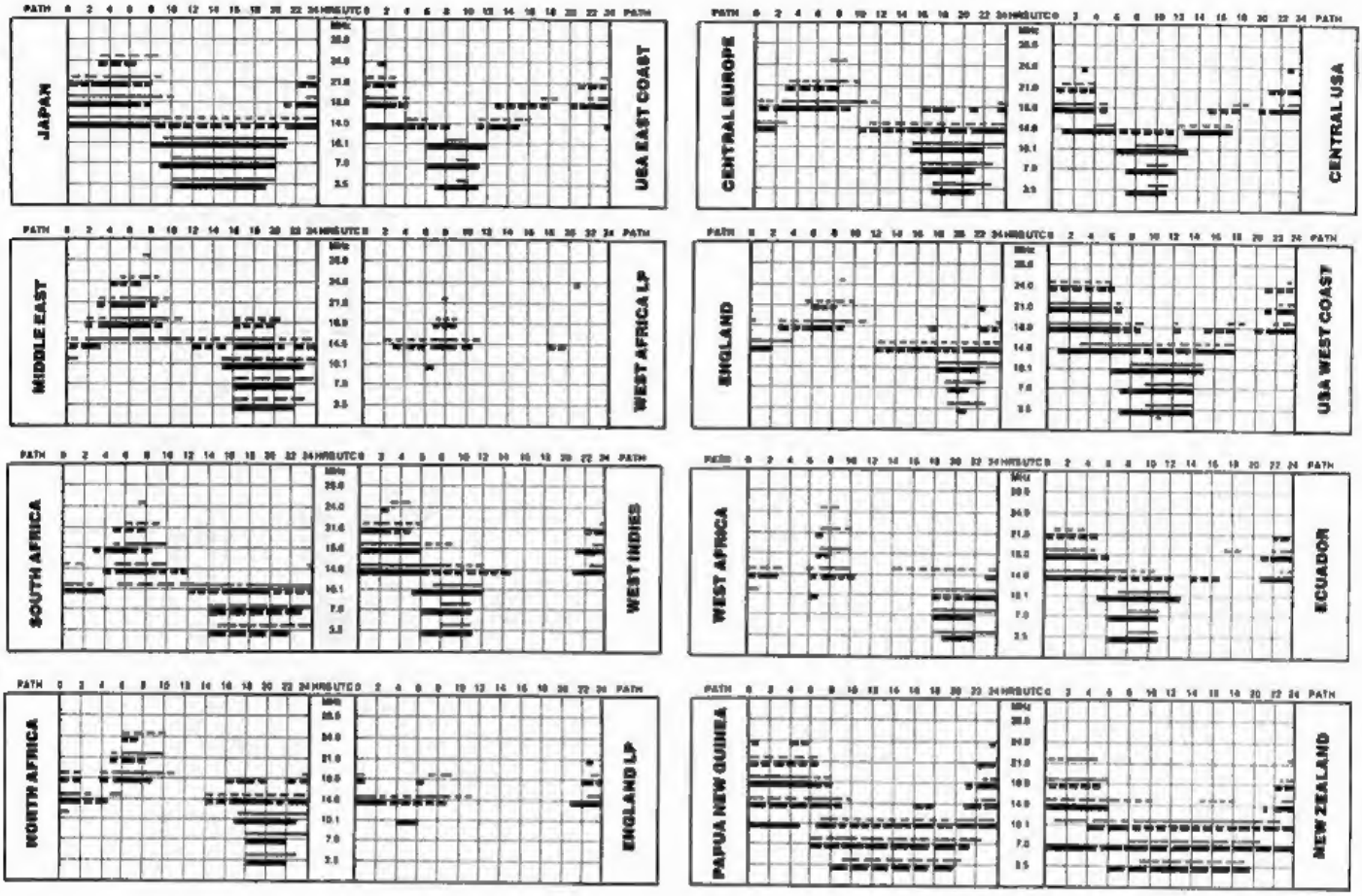
THE MODIFICATION OF Amateur Radio Service transceivers so they can transmit outside the amateur bands is illegal

The Department of Communications has issued a reminder that the fitting of Citizen Band Radio Service channels or any other out-of-band frequencies will not be condoned

DOC says it will take "positive action" if it finds anyone using amateur equipment in such a manner.

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic. 3060



LEGEND
From Western Australia (Perth)
From Eastern Australia (Canberra)
Mixed mode dependent on angle of radiation (long broken lines).
Better than 50% of the month, but not every day (continuous lines)
Less than 50% of the month (short broken lines).
All paths unless otherwise indicated; (ie LP = Long Path) are Short Path.

Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney.

Solar Geophysical Summary

FEBRUARY

Solar activity was low during the month with no energetic flares being observed. The sun was without spots during the period 01-09, 13, 16-19 and 23, 24. At other times, there were a number of small sunspot regions visible on the solar disc.

The 10 cm flux values ranged from a low of 69 on the fifth up to a high of 75 from the 25-28th. The monthly average of 71.5 was the lowest since September 1986.

The regions visible during the month appear to have been 'new cycle' regions, supporting the view that we have passed the solar minimum.

Geomagnetic Activity suggests that February was more disturbed than January which was an exceptionally quite month. The most disturbed day being the 20th when the A index recorded a value of 24.

February monthly values were:

Sunspot No	4.0
A Index	9.1

Sunspot yearly average for 8/86 was 13.3 following:

7/86	13.8
6/86	13.8
5/86	14.5
4/86	13.8
3/86	13.1
2/86	13.2

Certainly still in the doldrums and waiting for a considerable rise in solar activity to move these figures upwards to effect any real improvement in conditions.

It was back in 1964 that the solar flux figures dropped down to the 70s and the previously good DX producing conditions deserted us. Those who persevere are rewarded with the odd good day — even 10 metres comes alive albeit briefly. Interest is centred on the following nine months to see if the long awaited upsurge in solar activity will appear. When it does commence this upsurge in conditions will produce some good DX — the upward part of a new solar cycle brings some pleasant surprises.

—From data supplied by the Department of Science IPS Radio and Space Services February 1987

er

ANTARCTIC STATIONS

Mark VK9ML, Macquarie Island, has now got his iambic keyer working so will be sending a lot more CW than SSB. He will attempt to be on one of the following frequencies, CW, from 0908 UTC each Thursday depending on conditions (and inclination):

3.510, 7.010, 10.110, 14.010, 18.110, 21.010 MHz.

Mark note that there are a number of amateurs at the bases this year:

Macquarie Island
Graham Currie (Chompers) VK0GC
Doug Speedy VK0DS
Mark Loveridge VK0ML

Mawson
Mark Spooner VK0AQ
Alan Jeffrey VK0AJ
Andy Crammon VK0ZA

Davis
Frank O'Rourke VK0DA
David Rasch
T Lloyd VK0TW
Ray Clark VK0RC

Casey
P Marshall? VK0PM

It is not known how active these amateurs will be, but Mark says his great little island has "plenty to keep me busy!"

Ray Dobson VK5DI is Mark's QSL Manager.

—Contributed by Ray Dobson VK5DI

DEADLINE

All copy for inclusion in the **August 1987** issue of *Amateur Radio*, including regular columns and Hamads, must arrive at **PO Box 300, Caulfield South, Vic. 3162**, at the latest, by **9 am, June 19, 1987.**

Hamads

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write *each* on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. ***Please do not use scraps of paper.***

- Please remember your STD code with telephone numbers
- Eight lines free to all WIA members. $5.00 per 10 words minimum for non-members
- Copy in typescript, or block letters — double-spaced to ***Box 300, Caulfield South, Vic. 3162***
- Repeats may be charged at full rates
- QTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:
$22.50 for four lines, plus $2.00 per line (or part thereof)
Minimum charge — $22.50 pre-payable
Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105 x 220 mm SASE to: **RJ & US IMPORTS,** Box 157, Mortdale, NSW. 2223. CLOSED DURING JUNE (No inquiries at office . . . 11 Macken Street, Oakley). Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albury, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza. ACT.

WANTED — NEW CALEDONIA

RCA RECEIVING TUBE MANUAL: Please state year, condition and price. Write to Phill Hardstaff, C/o South Pacific Commission, BP D5, Noumea Cedex, New Caledonia.

WANTED — NSW

TRS 820(S), TS 830(S), TS 130(S), FT 101ZD: or similar. Must have digital display & manual. Reg VK2ELG, QTHR. Ph:(060) 43 1044.

YAESU FC-102 ANTENNA TUNER: FV-102 DM ext VFO to suit FT- 102 transceiver. Any area. Must be in good condition. Brett VK2PUC. Ph:(02) 570 7609.

WANTED — VIC

ATLAS HF TRANSCEIVER: 12 or 24 VDC, with mains P/S unit & cradle. Would consider alternative similar equipment. Barlow-Wadley PLL HF receiver. Price & details to: VK3ZA, C/o PO Box 423, Belmont, Vic. 3216. Ph:(052) 44 1277.

MOBILE 2 METRE TRANSCEIVER: Icom favoured. Robin VK3YRC. Ph:(03) 435 9104 (AH); (03) 690 8666 (BH).

OWNER'S MANUAL: or photocopy for receiver Sony ICF 7600D. Jim Linton VK3PC, QTHR.

WANTED — QLD

Any WIRE & WIRELESS TELEGRAPHY EQUIPMENT: Hand keys, paddles, keyers, buzzers, sounders, etc. Genuine collector. Contact Fred VK4NMA, QTHR. Ph:(07) 396 3521.

FILAMENT TERMINAL CONNECTORS: also plate & grid connectors for 833A tube for display purposes. Appreciate any help. VK4EF, QTHR. Ph:(07) 38 1803.

FT-101Z/ZD TCVR: with ATU if possible. Will consider complete rig. Must be in very good condition. Write Jim McPherson VK4CBU, 14 Tristania Street, Everton Hills, Qld. 4053. Sorry no phone.

FV-707DM EXTERNAL VFO: for Yaesu FT-707 transceiver. Please send details to VK4KHO, PO Box 2154, Mount Isa, Qld. 4825 or Ph:(077) 43 4508.

WANTED — WA

DOCTOR DX: Contest simulator module. John VK6JF, QTHR. Ph:(090) 21 2599.

FOR SALE — ACT

KENWOOD TS-820 TRANSCEIVER: $600 ONO. Icom IC-501 6 metre transceiver, 50-54 MHz, 10 watts, USB, LSB, CW, AM. $225 ONO. Ralph VK1RK, QTHR. Ph:(062) 81 0203.

PORTABLE COMPUTER: Tandy Model 100. Built in database, text editing, scheduler, BASIC & terminal software in ROM. Full size keyboard. Connectors for RS232, Centronics printer, cassette, built-in modem & bar code reader provided. Fitted with full 32k RAM, NiCAD batteries & perspex keyboard cover. Supplied with all manuals in original carton. One careful owner. VGC. Under half price at $445. Portable disc drive for Tandy 100/102/200 series computers. Battery powered. Uses 3.5" discs. Supplied with DOS. Under half current price at $145. Software on tapes & discs for Model 100. Includes commercial word processing, database, project management, spread-sheet, amateurs radio & utility programs. All with manuals plus some home-brew software. $95. Package deal of $670 for the lot. Contact Ray VK1ZJR, QTHR, or call Ph:(062) 65 2193 (BH) or (062) 88 0027 (AH).

FOR SALE — NSW

ICOM IC-471 H: High Power 80 watt 70 cm transceiver complete with internal power supply & AG-35 masthead preamp plus dual transceiver desk mic SM-8. $1810. Kenpro KR-5400A Azimuth & elevation rotators with common dual control box plus 12 core cable with plugs & sockets. $2 per metre. $520. Kenwood SM-220 station monitor with cables & book for use with TS-520 & TS-820. $480. Yaesu FT-2700 RH dual band 2 metre & 70 cm transceiver complete with voice synthesiser still under warranty sacrifice at $650. VK2ABO. Ph:(02) 86 4897.

KDK-FM2025 Mkll MOBILE TRANSCEIVER: with ¼ vertical & magnetic base. $350. Also Azden PCS-300 hand-held 3 watt transceiver inc ext speaker/mic, ½ wave telescopic $350. Tokyo Hy-Power HL-35V linear amp. $100. Bob VK2ZRG. Ph:(02) 625 4490.

KENWOOD TS120S, MC50, MM120. $475. TET Triband beam $225. HiGain TH6DXX Triband beam $300. 2 Icom IC2N hand-helds C/W BP8 battery packs & BC35 charger stand. $350. C Band 3.7-4.2 GHz satellite receiver for TVRO with down converter, LNA (95ºk) & feed horn with pole rotor $850. LNA 3.7-4.2 GHz 90ºk $150. New 4CX250B $50. VK2DDG. Ph:(066) 77 7405.

MODEM NETCOMM 1234A SMARTMODEM: with handset plus crosstalk communications software. Features autodial, autoranging, autoanswer & autodisconnect. Baud rates 2400 FDX, 1200 FDX, 1200/75 FDX, 300 FDX (V22Bis, V22, V23, V21, Bell 212A, Bell 103). Used once. Worth $2000 sell $1300 ONO. Barlow-Wadley XCR-30 communications receiver. 0.5-30 MHz. $75 ONO. Ph:(02) 451 1752.

SHACK CLEAR-OUT! Finding it hard to move so I'm selling excess goodies. IN4148s, WO2 bridges, resistors, various relays, ETI, EA, ARA, AR, W World, PE, PW, digital meters, cassette LEDS, BC548s, 4000 series ICs, IC sockets & loads more. Help me move again! Russell VK2DWF or wife Louise VK2DZV. Ph:(02) 639 0615.

YAESU FT-107 DMS: with scanning microphone. All solid-state & all WARC bands. Also instruction manual & full service manual in first class condition with original carton. Ph:(02) 477 6275 or 477 4947.

YAESU FT708R 70 cm TCVR: Complete with FNB2 NiCAD & case. $375. Plus spare FNB2 NiCAD. $30. PA3 car PWR/Charger adaptor. $45. YM24A speaker/mic for FT708R. $40. Oskerblock SWR-435 UHF PWR/SWR meter. $80. DSE Centaur 25W 70 cm linear amp. $80. DSE 70 cm 13 el Yagi (never used). $40. All in as new condition, manuals & original cartons. Will accept $550 for the lot. Reply Ph:(02) 649 9961.

YAESU FT-726R: 2m, 6m, 70 cm tribander complete with all modules, satellite board & CW filter. $2250 ONO. FT101E & ext VFO with CW filter. All manuals $500 ONO. HyGain quad, 2 elements, 3 band. Never used $300 ONO. VK2KLS, QTHR. Ph:(02) 747 4675.

2 METRE ALL MODE TCVR: Yaesu FT-225R, 240/12V, rptr xtals. $450. VS33 triband beam $230. KB105 10-80 trapped vert ant $130. Jim VK2PU, QTHR. Ph:(065) 69 5361.

2M HAND-HELDS: Kenwood TH21A. Near new cond with two spare batteries & case. $295. Icom IC2A VG cond with handbooks, case, spare battery, DC converter $195. 30 watt amplifier to suit either set $50. John VK2KOK, QTHR. Ph:(02) 918 2911.

FOR SALE — VIC

DECEASED ESTATE: Yaesu FL-2100, FL-101Z transceiver, FT-230R 2m transceiver, YD-148 Dynamic microphone, FV-101Z ext VFO, FT-7 transceiver, Hansen FS 500H power meter. Also many more items — all equipment in very good condition with manuals. Majority still have original packing. Complete list available from Ron Jardine, 26 Derimal Street, Horsham, Vic. 3400.

JRC HF TRANSCEIVER: As new comprising JST-100XCVR, NBD 500 PS, NFG-97 ant tuner & NVA-88 spkr. This is latest from JRC with ultimate in reliability & performance. Ph:(03) 842 8822 BH or (03) 715 1184 AH. Inspect at 27 Rosella Street, Doncaster East, Peter VK3IZ.

PRINTER: Hard copy, Tono HC-800, IBM compatible, incl full box paper, extra ink ribbon $450 ONO. PC. 'Bathtub' Morse key, WWII Model, best offer. PC. Dick Smith DC power supply 240/12V, 50 Hz, AC/3A DC. New $20. Bird wattmeter, PC. $140. Ph:(055) 62 6016.

SHACK CLEARANCE: Yaesu FT102, 17 mths old, fitted with FM unit & narrow SSB & CW filters. Mint condition — $1050. 4 element 20m (14 MHz) Mono Delta Loop Quad by W Wulf, constructed to convert to 3 element. Built on 6 mm thick aluminium scaffolding tube $350. Weltz 600 watt dummy load 1 to 30 MHz. $100. Avo meter model 7 $75. Contact Mario VK3NI (QTHR as VK3CWD). Ph:(03) 586 0625 (BH).

TTY MODEL 15: manuals, 110V supply. VK3AWM, QTHR. Ph:(03) 791 2528.

VIDEO CAMERA: Canon VME-1 super 8 mm. C/W acces pack. New, unused with warranty. New price $2600. Will sell $2000. Tower 35 ft crank- up/down suitable for TH3 or SIM & VHF/UHF arrays. $180. VK3WL. Ph:(03) 741 7654 (AH).

YAESU FRG-965 RECEIVER: VHF-UHF 60-900 MHz. As new. Unwanted gift. Price $650. Ph:(054) 28 3527 or 380 6244.

YAESU FT-230R: 2 metre FM 25 watts. 1 owner, excellent condition. Only been used as mobile rig. No mods, complete with original carton & instruction book. $400. Alf VK3DFW QTHR. Ph:(03) 873 3777 (BH); (03) 877 2983 (AH).

FOR SALE — QLD

KENWOOD TS-520S: Serial No 7406G9 with DC power supply, MC, plugs, handbook, original carton. Unmarked in full working order. $450. VK4WR, QTHR. Ph: (071) 41 1315 (AH).

MARCONI TF995B/5: AM/FM VHF RF signal generator. 2/220 MHz excellent condition & pedigree with handbook $1250. Vintern MM-2 deviation monitor 70-500 MHz $120. Hewlett Packard electronic frequency counter Model 5246L 0-500 MHz with manuals. $900. VK4OY. Ph:(07) 396 0886 anytime.

FOR SALE — SA

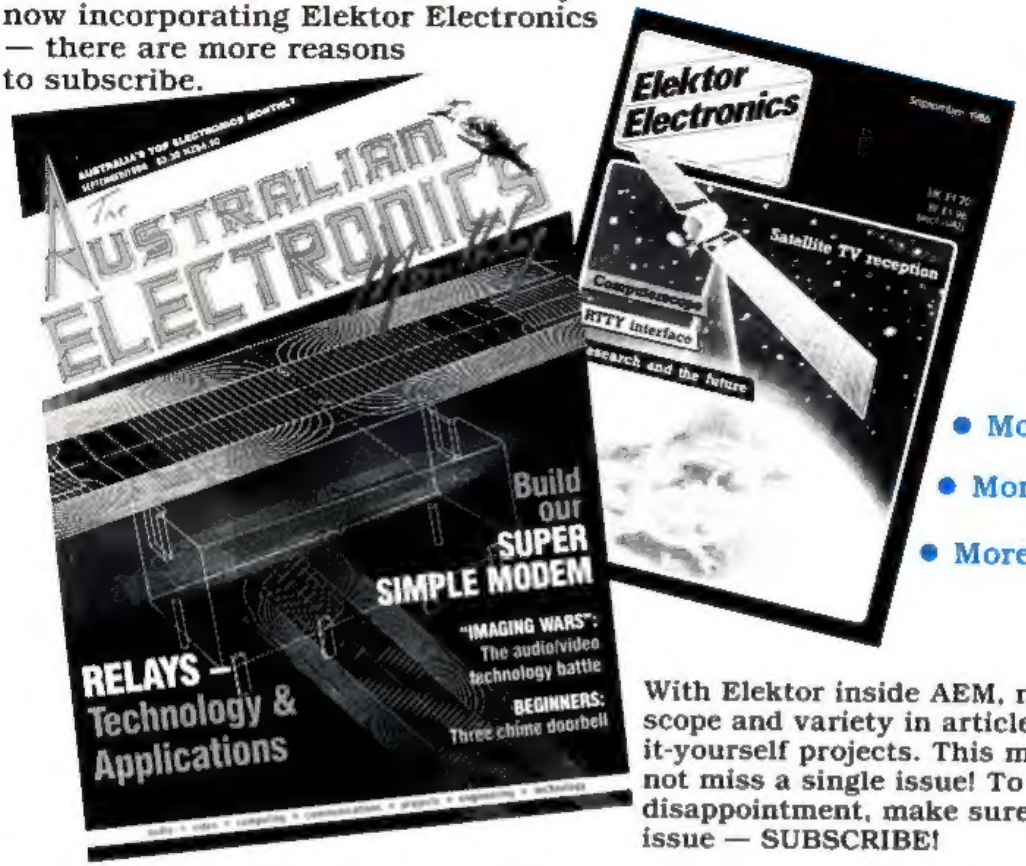
TET MODEL HB34D: 3 band beam antenna. Very good condition. $200. Saville VK5AHK, 2 Wood Street, Lobethal, SA. 5241. Ph:(08) 389 6221.

Advertiser's Index

AUSTRALIAN ELECTRONICS MONTHLY ..... IBC
A J & J COMAN 45
COMMONWEALTH OF AUSTRALIA 16
DICK SMITH ELECTRONICS ..... IFC
ELECTRONICS TODAY INTERNATIONAL ..... 25 & 33
EMTRONICS 27
IAN J TRUSCOTT'S ELECTRONIC WORLD 56
ICOM AUSTRALIA PTY LTD ..... BC
KENWOOD ELECTRONICS AUSTRALIA PTY LTD 35
LOCUS TECHNICAL 53
TEGA ELECTRONICS 29
VICSAT 24
WIA MAGPUBS ..... 29, 38 & 62
WIA (NSW DIVISION) NOVICE LICENCE 34
WILLIAM WILLIS & CO PTY LTD 50

Now there are more reasons to subscribe!

With Australian Electronics Monthly now incorporating Elektor Electronics — there are more reasons to subscribe.



- More projects!
- More features!
- More practical articles!

With Elektor inside AEM, now you get more scope and variety in articles, features and do-it-yourself projects. This means — you should not miss a single issue! To avoid disappointment, make sure you get every issue — SUBSCRIBE!

It's cheaper to subscribe! Rather than pay $57.00 for an annual subscription ($4.75 a month), you can subscribe at $49.95!

And what's more, you could win yourself a great Weller soldering station!
Fill out the coupon and send it today.

Australian Electronics Monthly is edited by Roger Harrison VK2ZTB and published by Kedhorn Holdings, Fox Valley Centre, Cnr Fox Valley Rd & Kiogle St, Wahroonga 2076 NSW.

SUBSCRIPTION FORM

Subscribe, and you could win this superb Weller WTCPN Soldering Station courtesy of Cooper Tools. Each month, we'll award this prize — worth over $140! — to the new subscriber who best answers the questions here.

Q1: Weller irons employ "....." point temperature control.

Q2: On a separate sheet of paper, in 30 words or less, what was it that prompted you to subscribe to AEM this month?

Annual subscription price: ~~$57.00~~ $49.95!
(overseas prices on application).

Complete this coupon, cutout or photostat and send to:

Subscriptions Dept.
Australian Electronics Monthly
PO Box 289, WAHROONGA 2076

Please forward 12 issues of Australian Electronics Monthly
Please tick payment method:
Bankcard ☐ Visa ☐ Mastercard ☐
American Express ☐ Cheque/money order ☐
(Please make cheques or money orders payable to Australian Electronics Monthly)

THE PRIZE

A transformer-powered soldering station, complete with a low voltage, temperature-controlled soldering pencil. The special Weller "closed loop" method of controlling maximum tip temperature is employed, thereby protecting temperature sensitive components, while the grounded tip and non-inductive heater protects voltage and current sensitive components. The soldering pencil features stainless steel heater construction, a non-burning silicon rubber cord and a large selection of iron plated tips in sizes from .8 mm diameter to 8 mm diameter with a choice of tip temperature of 315°C/600°F, 371°C/700°F and 430°C/800°F. The transformer case features impact-resistant mirel for durability and protection against accidental damage, a quick connect/disconnect plug for the soldering iron, extra large wiping sponge, tip tray to store extra tips, plus an improved off-on switch with a long-life neon indicator light, a non-heat sinking soldering pencil holder, and a 2 m flexible 3-wire cord.

Card No. .....
Expiry date .../.../...

Signature .....

Name .....

Address .....

..... Postcode .....

*Unsigned credit card orders cannot be accepted.

ICOM's New 2 Metre Mobile Base Station is simply JAM-PACKED with features.

ICOM IC-275A 2M BASE STATION

- ☐ Full 144-148 MHz Coverage
- ☐ 25 Watts
- ☐ 99 Tuneable Memories
- ☐ Dual Power Supply DC 13.8 V and Inbuilt 240 VAC Power Supply
- ☐ Multi-Mode Operation
- ☐ Fast switching-Packet/Amtor

Icom is pleased to present the most sophisticated 2 Metre Multi-Mode transceiver available today – the result of advanced Icom engineering and state-of-the-art microprocessor technology employing the unique Direct Digital Synthesiser (DDS) System, the successor to the Phase Locked Loop.

The IC-275A Two Metre transceiver is the latest product of Icom's intensive engineering development program, offering a level of sophistication never before seen in an amateur VHF transceiver.

Ultra-Compact Styling. Designed to complement the popular IC-735 HF mobile transceiver, the IC-275A measures only 241 mm wide by 95 mm high by 239 mm deep and weighs just 6.2 kg including in-built 240 VAC power supply.

Full Band Coverage. 144 to 148 MHz frequency coverage with unparalleled frequency stability, controlled by the Icom Direct Digital Synthesiser System.

99 Memory Channels. Frequency, mode, offset and sub-audible tone (with optional UT-34) are easily stored and retrieved in the 99 tuneable memory channels.

Instant Recall. Your most used frequencies can be stored in two extra priority memory channels for constant monitoring even while using other memories. An additional "Call Channel" stores your favourite repeater for instant access.

High Output Power. 2.5 to 25 Watts continuously adjustable output (100 Watts from the IC-275H) for extended operating range and easy OSCAR or PACKET operation from the IC-275A's 100% duty cycle transmitter.

Exceptional Receiver. To enhance weak signal reception, the IC-275A's receiver preamp, using disc type Ga As – FET and balanced mixer, provides better than 0.1 uV sensitivity (SSB CW 10 dB S/N) with selectivity of 2.2 kHz (SSB CW 6 dB) and more than 70 dB rejection of spurious signals.

Simplified Controls. All important controls are accessible from the front panel. Less frequently used controls pop out for convenient adjustment. A large LCD readout with orange backlight enhances mobile operation.

More Features. Full band scan, mode-selective scan and memory scan. Switchable AGC, noise blanket, speech processor, QSK switching (5 ms), velvet-touch tuning and notch filter. Multi-rate frequency stepping, pass-band tuning, VOX operation, odd offset capability and optional tone squelch facility. Full computer control with the new Icom CI-V computer control system.

Options. AG-25 Masthead Preamplifier, UT-36 Voice Synthesiser, UT-34 Tone Squelch Unit, CT-16 Satellite Communications Interface for co-tracking with IC-475 UHF transceiver, CT-15 AQS Adaptor, FL-83 Narrow CW Filter and CR-64 high-stability Crystal Unit. The IC-275A is also compatible with most other Icom accessories.

See the IC-275A at your nearest authorised Icom dealer or complete the coupon for more information.

Please send me details on:
☐ IC-275A ☐ ICOM's full range of communications equipment.

Sender's details:

Name _____

Address _____

_____ Postcode _____

Phone: (Business) (Home)

ICOM

The Frequency of Ideas.

All stated specifications are approximate and subject to change without notice or obligation. ICOM customers should be aware of equipment not purchased at authorised ICOM Australia Agents. This equipment is not covered by our parts and labour warranty.

POST TO: ICOM, 7 DUKE STREET, WINDSOR, VICTORIA 3181
OR PHONE (03) 51 2284 OR 5297582. ICOM3744